Geotechnical Data Report

SR 395 – North Spokane Corridor Section 1 – Hawthorne Road to US 2 Spokane, Washington

February 6, 2001

Prepared for

Washington State Department of Transportation

Prepared by



LANDAU ASSOCIATES, INC.

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1.0 INTRODUCTION

This geotechnical data report summarizes the field investigation and geotechnical laboratory testing completed in support of the Washington State Department of Transportation (WSDOT) SR 395 North Spokane Corridor – Section 1 project. The purpose of this investigation was to obtain subsurface information to characterize soil and groundwater conditions along the proposed Section 1 alignment.

The project location is shown on the Vicinity Map, Figure 1. The Site and Exploration Plan, Figure 2, shows the project area and location of the borings drilled for this investigation. A description of the field exploration program, the boring logs summarizing subsurface conditions, and a table summarizing pertinent information regarding each boring, are included in Appendix A of this data report. A description of the laboratory testing program along with the results of the laboratory testing are included in Appendix B of this data report.

Landau Associates was contracted by the Washington State Department of Transportation to provide geotechnical services to support the project. Our services were provided in accordance with on-call geotechnical services Agreement No. Y-7373 between the Washington State Department of Transportation and Landau Associates, Inc., and Task AA, Work Order XL-1154, and our July 28, 2000 Scope and Estimated Cost letter.

Our scope of services included the following specific tasks:

- Drilled 26 borings to depths of approximately 30 to 100 ft below the existing ground surface to characterize soil and groundwater conditions.
- Installed piezometers in selected borings for subsequent measurement of groundwater levels.
- Completed geotechnical laboratory testing on selected samples obtained from the borings.
 Laboratory testing consisted of natural moisture content determinations, grain-size analyses, and Atterberg Limit determinations.
 Laboratory testing was completed by Soil Technology, Inc. under subcontract to Landau Associates.
- Prepared and submitted this data report summarizing the field exploration and laboratory testing program, and regional and project site geology.

2.0 PROJECT DESCRIPTION

As shown on the Vicinity Map, Figure 1, the proposed SR 395 North Spokane Corridor Project is planned to connect Interstate 90 (I-90) with US Highway 2 (US 2) and rejoin State Route 395 (SR 395) at the Little Spokane River. As currently proposed, the corridor will extend north from I-90, west of Freya Street, and parallels Market Street until Francis Avenue. The alignment jogs northeast about ¼ mile and then continues northward. The proposed alignment crosses at the junction of Market Street and Hawthorne Road, and then turns northwest and intersects US 2 at Shady Slope Road. The alignment turns westward and ties into SR 395 just south of the Little Spokane River bridge at SR 395.

The Section 1 project extends from Hawthorne Road to US 2. Cuts and fills of up to 75 to 80 ft are proposed to establish road grades through Section 1. Elevated crossings are planned for Market Street, Parksmith Drive, and the BNSF railroad tracks, and undercrossings are planned for Farwell Road and US 2. Interchanges are proposed for Parksmith Drive and US 2.

3.0 GEOLOGIC SETTING

The following sections provide a description of the existing surface conditions and topographic setting, regional geology of the project area, and a description of the various geologic units encountered in the explorations along with a summary of the distribution of the various geologic units encountered in the project area.

3.1 SURFACE AND TOPOGRAPHIC CONDITIONS

The project area lies within the northern portion of the Spokane Valley, west of the unincorporated area of Mead. The surface topography within the Section 1 area is generally gently rolling to nearly flat-lying. The proposed Section 1 route is largely undeveloped, and surface vegetation varies from sparse grassland to pine forest. The route crosses through an aggregate operation and a construction material storage yard between Market Street and Parksmith Drive; a trailer park is located east of the alignment, about 2/3 of a mile north of Hawthorne Road; and scattered single-family residences and small-scale commercial development are centered around Farwell Road and US 2.

Most of the surficial soil observed within the Section 1 area consists of fine and fine to medium sand. These soil types are generally considered to have a moderate to severe potential for wind and/or water erosion. Localized areas of steep slopes (slopes with gradients of 40 percent or more) exist in the Section 1 area. These areas are generally located in the area between Hawthorne Road and Farwell Road, and consist of either dune faces or human-made cuts. Based on the lack of vegetation on many of the slopes and our past experience with similar soil types, many of these slopes appear to be at or near the soil's natural angle of repose and are subject to continued raveling.

3.2 REGIONAL GEOLOGY

Bedrock and sedimentary units in the project area include, from oldest to youngest: metamorphic and igneous rocks, the Latah Formation and Columbia River Basalt Group, Lake Missoula catastrophic flood deposits, and eolian deposits, which are described in the following paragraphs.

3.2.1 PRE-TERTIARY METAMORPHIC AND IGNEOUS ROCKS

The Spokane area is underlain by high-grade metamorphic rocks of the Spokane dome of the Priest River metamorphic core complex. The core rocks have been intruded by Cretaceous and early Tertiary granitic rocks (Boleneus and Derkey 1996). These rocks were deeply eroded, leaving a surface of considerable relief.

These rocks formed a generally northwest trending mountain range with drainages extending into the lowlands to the south. Limited exposures of the Priest River metamorphic complex have been mapped along the base of the hillside in the vicinity of Lincoln Road and Saint Michael Road (Joseph 1990). Exposures of the granitic rocks have been mapped southeast of the intersection of Market Street and Stoneman Road (Derkey 1997), along the base of the hillside in the vicinity of Fairview Road (Kiver, Rigby, and Stradling 1979), and along the west side of SR 395, south of the Little Spokane River Bridge (Derkey, Gerstel, Logan 1998).

3.2.2 TERTIARY VOLCANIC AND SEDIMENTARY ROCKS

During the Miocene Epoch (late Tertiary), between 5 and 24 million years ago, extensive flows of basaltic lava flooded the region, covering the lower valleys and foothills and abutting the higher mountains. The basalt flows covered more than 100,000 square miles in parts of Washington, Idaho, and Oregon. The basalt flows are generally thought to have entered the Spokane area from the south and southwest, probably erupting from vents in the area of the Chief Joseph dike swarm in the southeast corner of Washington (Robinson 1991). In the project area, the individual flows are generally flat-lying and have thicknesses of 50 to 150 ft (Griggs 1973). Two formations of the Columbia River Basalt Group have been mapped in the area: the Wanapum Basalt (Priest Rapid Member) and the Grande Ronde Basalt (Derkey 1997; Derkey, Gerstel, and Logan 1998). The Grande Ronde Basalt is between 15.6 and 16.4 million years old, and is generally designated as "valley" flows due mainly to exposures in valleys around the Spokane area. The Wanapum Basalt is between 15 and 14 million years old and is generally designated as "rim rock" flows mainly because it caps the bluffs in the project area. The basal contact of the Wanapum Basalt is typically about elevation 2,200 ft in the project area (Derkey 1997).

The earlier basalt flows likely blocked stream/river drainages, possibly including those of the ancestral Spokane and Columbia River, forming either a series of lakes (or possibly a single large basin as argued by Robinson [Robinson 1991] based on stratigraphic correlations) along the north and east rim of the basalt field. The basin is generally thought to be arcuate in shape, extending from near Grand Coulee Washington to Moscow, Idaho. Lacustrine sediments, derived from erosion of the older basalts and the pre-Tertiary rocks in the region, were deposited in the basin. These sediments, consisting of primarily silt and clay, with minor sand and gravel, form the Latah Formation. The Latah Formation is generally described as poorly indurated siltstone, claystone, sandstone, and minor conglomerate, containing scattered volcanic ash layers. Little data is available regarding the general depositional nature of the Latah Formation, but sediment was likely deposited by drainages flowing into the basin from the east and north. The Latah Formation generally exhibits an "upward coarsening" sequence, which is typical of lake-type depositional environments.

The Latah Formation discontinuously outcrops along the north and east rims of the basalt field. Outcrops have been mapped as far west as Grand Coulee and near Kellers Ferry, Washington, and encountered in deep wells at Davenport and Odessa, Washington (Robinson 1991). The Latah Formation is exposed along I-90 in the Coeur d'Alene area (ITD 2000) and is intermittently present as far south as Moscow, Idaho (Robinson 1991).

In the general project area, the Latah Formation is estimated to be more than 1,000 ft thick in places (Derkey 1997). Where exposed in the Spokane region, the Latah Formation generally overlies the Grande Ronde Basalt and underlies the Wanapum Basalt. Within the project area, the Latah Formation is overlain by Wanapum Basalt and is exposed on the hillsides east of Market Street at the south end of Section 1 and the northern end of Section 3, and in limited exposures on the hillsides northwest of US 2.

3.2.3 PLEISTOCENE AND HOLOCENE GEOLOGY

During the Pleistocene Epoch (early Quaternary), 10,000 to 2 million years ago, vast continental ice sheets advanced into the Spokane valley. Evidence indicates that there were at least four to possibly six advances of the continental ice into the region during the Pleistocene (Molenaar 1988). The latest advance, which occurred between about 12,000 and 22,000 years ago, had the greatest effect on the present day landscape. Two lobes of ice advanced into the area: the Pend Oreille lobe, which is thought to have advanced west down the present day Spokane River Valley to as far as the eastern city limits (Weis and Richmond 1965); and the Little Spokane lobe which is thought to have advanced southward to near Milan (Weis and Richmond 1965), about 15 miles north of the project area. Melt water deposits, chiefly of sand and gravel, with silt and clay, were deposited in and along the valleys of the Little Spokane and Spokane Rivers. In addition, a proglacial lake, known as Lake Columbia, occupied much of the Spokane Valley during the Pleistocene. Remnants of the lake sediments exist in tributary valleys such as the Peone Prairie north of Spokane (east of the project area). The glacial lake deposits consist predominantly of sand, silt and clay with scattered drop stones.

Glacial ice of the Purcell lobe is thought to have periodically blocked the Clark Fork River near the present day Idaho/Montana border, forming a great ice dam across the valley. Melt water from other ice lobes further up the Clark Fork River drainage became impounded behind the ice dam, forming a vast lake in present day western Montana referred to as Glacial Lake Missoula. At its highest level, the lake covered an estimated 3,000 square miles and contained an estimated 500 cubic miles of water (Molenaar 1988). Periodically the ice dam failed, releasing an enormous volume of water that flowed across the landscape. It has been speculated that the entire lake may have drained within a few days, resulting in a peak flow across the Columbia Plateau at 750 million cubic feet a second (Molenaar 1988). The majority

of this flood water rushed through the Spokane River and Little Spokane River valleys en route to the Columbia River.

Flood waters inundated the Spokane area to a maximum elevation of 2,700 ft (Derkey 1997). Though the number of Pleistocene flood events are unknown, each flood event likely swept down the Spokane and Little Spokane River valleys scouring deposits of the previous flood events, cutting new channels into the pre-Pleistocene bedrock, and leaving behind new deposits of boulders, cobbles, gravel, and sand. In less energetic environments, slack water deposits of chiefly sand and lacustrine sediments were laid down. The maximum thickness of the flood deposits in the Little Spokane River Valley are on the order of 500 ft (Derkey 1997).

Surficial deposits of wind-blown sand (Holocene [present to 10,000 years ago] and Pleistocene Epoch) are present over the flood deposits over much of the project area, south of Farwell Road. The wind-blown deposits are derived primarily from Pleistocene flood deposits that mantle much of the project area.

3.3 PROJECT GEOLOGY

In the immediate project area, the near-surface geology between Parksmith Drive and Farwell Road generally consists of wind-blown (eolian) sand deposits (Qes) overlying Pleistocene flood deposits (Qf). Southwest of Parksmith Drive, the wind-blown sand deposits were not always present at the surface. Field observations and review of the Mead 7.5 minute topographic map (USGS 1981) indicate that past mining activities likely removed much of the wind-blown sand deposits between Market Street and Parksmith Drive. Between Farwell Road and US 2, Pleistocene flood deposits (Qf) were present to the depths explored. The Pleistocene flood deposits were observed in the borings to be interfingered with finer-grained deposits, interpreted as slack-water deposits laid down during the Pleistocene floods (Gerstel 2000).

The wind-blown deposits observed in the borings generally consist of a loose to medium dense and occasionally dense, homogeneous, poorly graded, fine and fine to medium sand. The sand was typically light brown to brown in color with subangular to rounded grains. The sand generally shows a strong reaction to hydrochloric acid (HCL). The thickness of the wind-blown deposits was observed to vary from about 5 ft in boring PRK-3-00 to about 40 ft in boring PH1-6-00. South of Parksmith Drive, the wind-blown sand was not present at borings locations PH1-1-00, DP-1-00, DP-2-00, and DP-3-00; and in the vicinity of Farwell Road, the wind-blown sand was not present at boring locations DP-13-00, DP-5-00, DP-13-00, US2-1-00, US2-2-00, and US2EB-1-00.

The Pleistocene flood deposits were encountered beneath the wind-blown deposits or at the surface in all of the borings and generally extended to the depths explored. The deposits are generally

coarser-grained than the wind-blown deposits and consist of medium dense to dense, and occasionally very dense, homogeneous, well graded to poorly graded, fine to medium and fine to coarse sand, occasionally with a trace of fine gravel. The sand was typically light grayish-brown to brown in color, with subangular to rounded grains. Reaction to hydrochloric acid (HCL) was generally strong, but occasionally weak to none. These deposits are consistent with a lower energy environment, such as at the margins of the flood, in back waters, or as the flood waters receded.

Interfingered with the Pleistocene flood deposit are interbedded, fine-grained deposits of stiff to very stiff, lean clay; and medium dense elastic silt and sandy silt; over and interbedded with deposits of medium dense, silty fine sand. These deposits were encountered in borings DP-3-00, DP-4-00, DP-5-00, DP-12-00, DP-13-00, FARW-2-00, FARWSB-1-00, PH1-1-00, PH1-4-00, PH1-5-00, PH1-6-00, PRK-2-00, US2-1-00, US2-2-00, and US2SB-1-00. The deposits were observed in the borings to be highly variable in vertical thickness and lateral extent. In the borings, the thickness of the deposits varied from a single layer less than 6 inches to interbedded deposits between 4 to 6 ft thick. In boring DP-4-00, the sequence of fine-grained deposits was about 12 ft thick. Lean clay and elastic silt were observed in the borings to vary from homogeneous to stratified, while the sandy silt deposits are typically homogeneous. The deposits show a variable reaction to HCL, from nonexistent to strong. These units are interpreted to be slack-water deposits laid down during the Pleistocene floods. These deposits are often overlain and underlain by, and occasionally interbedded with, the lower energy flood deposit of well graded and poorly graded sand.

3.4 GROUNDWATER

Groundwater was encountered at the time of drilling in borings DP-5-00 and PH1-8-00 at a depth of about 25 ft below the existing ground surface. Wet soil was encountered near the bottom depth of borings DP-12-00, FARW-1-00, and FARW-2-00, which may indicate that groundwater is near that depth. In several borings (PH1-6-00 and US2-2-00), introduction of drilling fluid into the formation during drilling masked the presence of possible groundwater that may have been encountered during drilling. Piezometers were installed in 19 of the borings for subsequent measurement of groundwater levels. Table 1 summarizes groundwater levels measured in the piezometers between the dates of December 6, 2000 and January 22, 2001. Groundwater depths were measured by a representative of WSDOT. If present, the first two groundwater measurements at each boring location are shown on the summary logs in Appendix A.

4.0 USE OF THIS REPORT

This geotechnical data report was prepared for the exclusive use of the Washington State Department of Transportation for specific application to this project. The use by others, or for purposes other than intended, is at the user's sole risk. The findings, recommendations, and opinions presented herein are based on review of readily available geologic information, field explorations, and our understanding of the project requirements. Within the limitations of scope, schedule, and budget, information presented in this data report was prepared in accordance with generally accepted professional geotechnical engineering principles and practices in this area at the time this document was prepared. We make no other warranty, either express or implied.

We appreciate the opportunity to provide these services to the Washington State Department of Transportation and look forward to providing further assistance on this project. Please contact either Mr. Edward J. Heavey at 253-926-2493 or Mr. Dennis Stettler at 425-778-0907 if you have any questions regarding the information contained in this data report.

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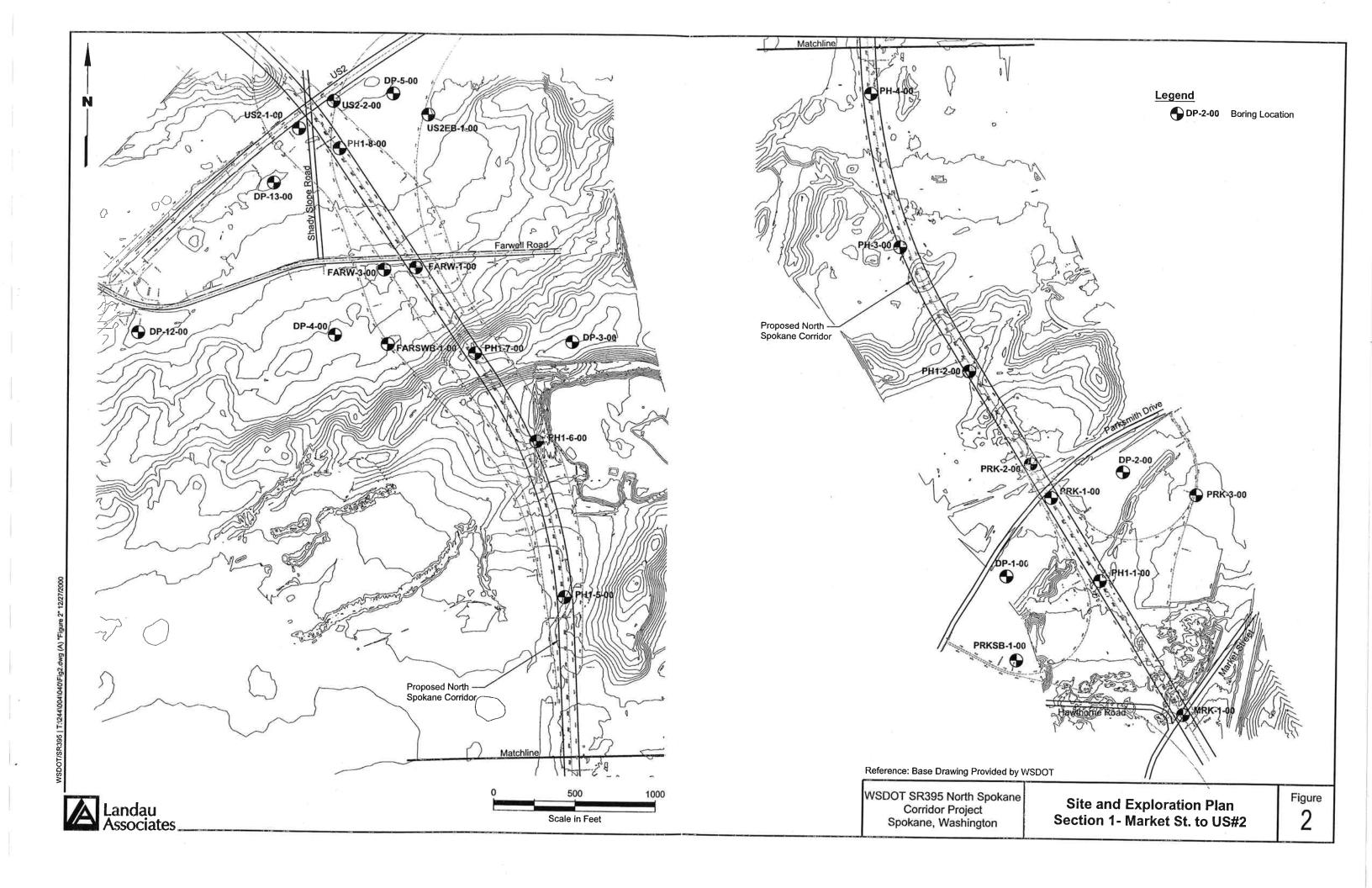
TABLE 1 GROUNDWATER DATA

Boring No.	Ground Elevation	Depth to water (11)							
	(ft)	Dec. 6, 2000	Dec. 15, 2000	Jan. 5, 2001	Jan. 8, 2001	Jan. 10, 2001	Jan. 19, 2001*	Jan. 20, 2001*	Jan. 22, 2001*
DP-1-00	1932.0					Dry			1 22, 2007
DP-2-00	1922.4					Dry			
DP-3-00	1900.3	Dry	61.8		61.4	61.7			Dry
DP-4-00	1856.9	Dry	Dry		Dry	Dry			Diy
DP-5-00	1841.2	29.3	29.3		28.6	29.1		27.8	
DP-12-00	1838.3			51.9			51.8	27.0	
DP-13-00	1840.6		33.7				31.0	33.5	
FARW-2	1847.5	52.0	52.1	52.2	51.7		52.2	33.3	
FARWSB-1	1861.0		41.3		40.9	41.3	41.3		
PH1-2-00	1930.2					Dry	(1.5		
PH1-4-00	1907.9	Dry	Dry		Dry	Dry			
PH1-5-00	1908.8	Dry	Dry		Dry	Dry			Dry
PH1-6-00	1941.7	85.5	88.6		87.4	87.3		200 001	Diy
PH1-7-00	1909.2	Dry	Dry		Dry	Dry			,
PH1-8-00	1836.1	23.9		26.4	28.6	2.7		26.0	26.7
PRK-1-00	1925.8					Dry		20.0	20.7
PRKSB-1	1932.0					31.0			
US2-2-00	1838.1	23.1	23.1		23.3	23.3		23.1	
US2EB-1-00	1835.5	19.8	19.9		19.6	20.0		20.0	

^{*} Water levels measured after pumping







Field Explorations

APPENDIX A FIELD EXPLORATIONS

Subsurface conditions for the Section 1 portion of the North Spokane Corridor project were explored by completing a series of 26 borings along the proposed route. The location of the borings are shown on Figure 2. The borings were completed to depths of approximately 30 to 100 ft between the dates of September 26 through October 24, 2000 and on December 1, 2000. The borings PRKSB-1-00, PH1-6-00, and US2-1-00 were drilled by Crux Subsurface, Inc. of Spokane, Washington (under contract to WSDOT) using a track-mounted, Morooka MST-1100 drill rig and the triple tube drilling method (HWT Casing with a HQ core). The remaining borings for Section 1 were drilled by Ruen Drilling, Inc. of Clark Fork, Idaho (under contract to WSDOT) with a truck-mounted, Mobile B-61 drill rig advancing hollow-stem augers, or HWT casing for borings DP-5-00, DP-13-00, and US2EB-1-00.

Disturbed samples of the soil encountered in the borings were obtained at frequent intervals using a 2.0-inch, outside-diameter (OD), split-spoon sampler. The sampler was driven into the undisturbed soil ahead of the auger bit with a 140-pound drop hammer falling a distance of approximately 30 inches. The number of blows required to drive the sampler for each six-inch interval of soil penetration, or part thereof, is noted on the boring logs next to the appropriate sampler notation. The number of blows required to drive the sampler the last 12-inches of the 18-inch drive, termed the standard penetration resistance (N), is also noted on the boring logs. Relatively undisturbed samples of fine-grained soil were obtained using a thin-wall Shelby tube advanced ahead of the auger bit with the drill rig's hydraulics. The tubes were extracted from the bore, capped, and tape-sealed for temporary storage.

Standpipe piezometers were installed in all borings with the exception of FARW-3-00, MRK-1-00, PH1-2-00, PH1-3-00, PRK-2-00, PRK-3-00, and US2-1-00, for subsequent measurement of groundwater levels. Details of the piezometer installation are shown on the summary logs in this appendix. The remaining borings were abandoned in accordance with 173-160 WAC.

The field explorations were coordinated and monitored by a geologist from our staff or by a geologist from Yonemitsu Geologic Service (under subcontract to Landau Associates) who maintained detailed records of encountered subsurface soil and groundwater conditions, obtained representative soil samples, and described the soil by visual and textural examination. The exploration locations, shown on Figure 2, were field-located by WSDOT surveyors. Ground surface elevations at the boring locations were determined by WSDOT surveyors. Table A-1 provides a summary of the relevant data regarding the boring locations by stationing and offset, ground surface and casing elevation, and other pertinent data.

All soil encountered in the borings was described using the WSDOT Soil and Rock Classification System, which is a modified version of the Unified Soil Classification System as outlined in ASTM D2488 Standard Recommended Practice for Description of Soil (Visual-Manual Procedures).

A key to the classification system and the boring logs is presented on Figure A-1 in this appendix. The boring logs are presented on Figures A-2 through A-27.

TABLE A-1

BORING DATA

	ģ		YES) (<u>;</u>	} c	, ç.	, i	ខ្ព	0	0	0	S	ı ç	S.	ုလ္	S	, v	, in	, so	<u>က</u>	S.	S	, v	y.	, ic) ()
	Diozomoroid							YES								YES			YES		YES	YES	YES	YES			•
	Easting (Proj Datum)	2823021 93	2821982.18	2822492.51	2823084.37	2821912.18	2822626.06	2822184.96	2822054.26	2821664.27	2821227.18	2821033.23	2820954.32	2820769.65	2820980.91	2820385.27	2819842.25	2819517.35	2820011.15	2819815.34	2818300.52	2820078.16	2819533.66	2819134.35	2819859.30	2819284.53	
	Northing Easting	621982.99	622307.01	622802.83	623341.22	622826.54	623482.34	623315.94	623526.93	624101.77	624867.67	625807.82	627080.84	628048.44	628670.13	628593.85	628647.73	628702.56	629124.71	629117.46	628711.59	630070.40	629855.97	629642.41	630196.90	629978.24	
Offset		lΩ	-705.62	-10.09	777.14	-489.67	463.25	1.00	1.96	-24.14	-41.65	2.60	-0.40	69.63	549.44	10.66	-409.40	-648.09	-2.65	-169.04	-1651.84	581.72	10.40	-440.05	471.15	-122.77	
	Station (#)	377+90.197	386+15.967	387+66.008	389+08.952	390+93.643	392+71.503	393+64.129	396+12.323	403+06.479	411+83.463	421+40.061	434+15.809	443+91.530	447+99.231	450+49.259	453+97.587	456+24.718	456+98.566	458+02.055	463+12.649	464+45.111	465+71.821	466+18.060	466+68.423	468+19.826	
Pipe	or Cap Elev	۷/۷	1934.1	1929.6	N/A	1932.0	1922.4	1925.8	N/A	N/A	N/A	1910.8	1912.4	1943.9	1902.3	1911.6	1863.4	1859.5	1848.0	N/A	1841.3	1838.2	1839.1	1843.4	1844.3	A/N	
Ground	Elev at Bore Hole	1955.3	1932.0	1929.6	1927.1	1932.0	1922.4	1925.8	1926.1	1930.2	1917.3	1907.9	1908.8	1941.7	1900.3	1909.2	1861.0	1856.9	1847.5	1850.3	1838.3	1838.9	1836.1	1840.4	1841.2	1837.9	000
1	Bore Hole ID#	MRK-1-00	PRKSB-1-00	PH1-1-00	PRK-3-00	DP-1-00	DP-2-00	PRK-1-00	PRK-2-00	PH1-2-00	PH1-3-00	PH1-4-00	PH1-5-00	PH1-6-00	DP-3-00	PH1-7-00	FARWSB-1-00	DP-4-00	FARW-1-00	FARW-3-00	DP-12-00	US2EB-1-00	PH1-8-00	DP-13-00	DP-5-00	US2-1-00	110.000
	Bore Hole Point #	BH1000	BH37787	BH1090	BH37705	BH1091	BH1089	BH1003	BH37683	BH1092	BH1093	BH1094	BH1099	BH1103	BH37684	BH37689	BH37694	BH37699	BH37704	BH37706	BH37782	BH37749	BH37744	BH39050	BH37754	BH37738	RH27730
	Property Owner	Spokane Co.	Kaiser	M.S. Kuney	J. & G. Hedley	M.S. Kuney	Kaiser	M.S. Kuney	Kaiser	BPA	BPA	BPA	BPA	BPA	BPA	BPA	BPA	BPA	BPA	BPA	Kaiser	G.G. Miller	C.K. Zincgraf	Mead School Dist #354	Miller Family Partnership	US 2	6811
	Parcel No.	Market St.	6-05415	6-05413	6-05412	6-05413	6-05415	6-05413	6-05415	6-05408	6-05408	6-05408	6-05408	6-05408	6-05408	6-05408	6-05408	6-05408	6-05408	6-05408	6-05415	6-05420	6-05428	6-05426	6-05429	US 2	S
	Proj. No.	~	-	-	-	-	₩.	_	-	-	-	-				-	-	₩-	▼	-		-	-	-	-	_	-

Test Boring Legend

Page 1 of 2

	Sampler Symbols
	Standard Penetration Test
	Oversized Penetration Test (Dames & Moore, California)
	Shelby Tube
P	Piston Sample
115	Washington Undisturbed
	Becker Hammer
Ш	Core
G	Grab Sample
B	Bag Sample

	Well Symbols
1 0 0	Cement Surface Seal
	Piezometer Pipe in Granular Bentonite Seal
	Piezometer Pipe in Sand
	Well Screen in Sand
	Granular Bentonite Bottom Seal
	Inclinometer Casing in Concrete Bentonite Grout

	Laboratory Testing Codes
υυ	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
UC	Unconfined Compression Test
DS	Direct Shear Test
CN	Consolidation Test
GS	Grain Size Distribution
МС	Moisture Content
SG	Specific Gravity
OR	Organic Content
DN	Density
AL	Atterberg Limits
PT	Point Load Compressive Test
SL	Slake Test
DG	Degradation
LA	LA Abrasion

	Soil Density	Modifier	rs
Gravel,	Sand & Non-plastic Silt	Elastic	Silts and Clay
SPT Blows/ft	Density	SPT Blows/ft	Consistency
0-4	Very Loose	0-1	Very Soft
5-10	Loose	2-4	Soft
11-24	Medium Dense	5-8	Medium Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

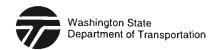
Α	ngularity of Gravel & Cobbles
Angular	Coarse particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Coarse grained particles are similar to angular but have rounded edges.
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges.
Rounded	Coarse grained particles have smoothly curved sides and no edges.

S	oil Moisture Modifiers
Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

	Soil Structure
Stratified	Alternating layers of varying material or color at least 6mm thick; note thickness and inclination.
Laminated	Alternating layers of varying material or color less than 6mm thick; note thickness and inclination.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into smaller angular lumps which resist further breakdown.
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous	Same color and appearance throughout.

	HCL Reaction
No HCL Reaction	No visible reaction.
Weak HCL Reaction	Some reaction with bubbles forming slowly.
Strong HCL Reaction	Violent reaction with bubbles forming immediately.

Degree of	Vesicularity of Pyroclastic Rocks
Slightly Vesicular	5 to 10 percent of total
Moderately Vesicular	10 to 25 percent of total
Highly Vesicular	25 to 50 percent of total
Scoriaceous	Greater than 50 percent of total



Test Boring Legend

Page 2 of 2

		Grain Size
Fine Grained	< 1mm	Few crystal boundaries/grains are distinguishable in the field or with hand lens.
Medium Grained	1mm to 5mm	Most crystal boundaries/grains are distinguishable with the aid of a hand lens.
Coarse Grained	> 5mm	Most crystal boundaries/grains are distinguishable with the naked eye.

Weathered State	
Description	Grade
No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces.	I
Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition.	II
Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III
More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone.	IV
All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	v
All rock material is converted to soil. The mass structure and material fabric is destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI
	Description No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces. Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition. Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones. More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone. All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.

Relative Rock Strength									
Grade	Description	Field Identification	Uniaxial Compressive Strength approx						
R1	Very Weak	Specimen crumbles under sharp blow from point of geological hammer, and can be cut with a pocket knife.	1 to 25 MPa						
R2	Moderately Weak	Shallow cuts or scrapes can be made in a specimen with a pocket knife. Geological hammer point indents deeply with firm blow.	25 to 50 MPa						
R3	Moderately Strong	Specimen cannot be scraped or cut with a pocket knife, shallow indentation can be made under firm blows from a hammer.	50 to 100 MPa						
R4	Strong	Specimen breaks with one firm blow from the hammer end of a geological hammer.	100 to 200 MPa						
R5	Very Strong	Specimen requires many blows of a geological hammer to break intact sample.	Greater than 200 MPa						

Discontinuities

S	pacing					
Very Widely	Greater than 3 m	Excellent	Ver Slig disc			
Widely	1 m to 3 m	Good				
Moderately	0.3 m to 1 m					
Closely	50 mm to 300 mm	Fair	Slig			
Very Closely						
RO	Poor	Slic disc				
100(length of c	Very Poor	Sof				

	Condition
Excellent	Very rough surfaces, no separation, hard discontinuity wall
Good	Slightly rough surfaces, separation less than 1 mm, hard discontinuity wall.
Fair	Slightly rough surfaces, separation greater than 1 mm, soft discontinuity wall.
Poor	Slickensided surfaces, or soft gouge less than 5 mm thick, or open discontinuities 1 to 5 mm.
Very Poor	Soft gouge greater than 5 mm thick, or open discontinuities greater than 5 mm.

Fracture Frequency (FF) is the average number of fractures per 300 mm of core. Does not include mechanical breaks caused by drilling or handling.

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Department of Transportation

HOLE No.	MRK-1-00		Department of Transp	ortation
PROJECT	WSDOT SR395 North Spokan	e Corridor Project	Job No. XL1154	
	Spokane, Washington		S.R. 395	
Station _	377+90.197	Offset 4.43	C.S	
Equipment	B-61	Casing 8-in H		
Method of B	oring 8-in Hollow Stem Auge	r		
Start Date	October 24, 2000	Completion Date	October 24, 2000 Sheet 1 of 3	
Depth (ft) Meters (m)	Standard Penetration Blows/ft 10 20 30 40	Sample Type Sample No. (Tube No.)	Description of Material	Groundwater
SOIL IAPROJECT244/004.10/WDOTPHIA.GPJ WSDOT.GDT 2/1/01-11:00:25 A2		3 5 5 (10) D-1 5 8 (13) D-2 9 U-3	Poorly graded SAND with trace silt, loose, subrounded to subangular, medium dense, gray-brown, dry to moist, homogeneous, weak HCL reaction (Qes) Poorly graded SAND with trace of silt, subrounded to subangular, medium dense, gray-brown, dry to moist, homogeneous, weak HCL reaction (Qes) Well graded SAND, subrounded to subangular, loose, gray-brown, moist, homogeneous, weak HCL reaction (Qes)	

HOLE No. MRK-1-00

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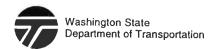
Sheet 2 of 3 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

Sample Type (Tube No.) Standard Meters (m) Sample No. € Groundwater SPT Profile Lab Penetration Depth (Blows/6" Description of Material Blows/ft (N) 10 20 30 40 D-4 Poorly graded SAND, subangular to subrounded, medium 5 dense, gray-brown, moist, homogeneous, weak HCL 6 reaction (Qf) (11)25 D-5 Well graded SAND, subrounded to subangular, medium 6 dense, gray-brown, moist, homogeneous, weak HCL 9 reaction (Qf) (15)30 D-6 6 Silty SAND, subrounded to subangular, medium dense, 9 (15)brown to light brown, homogeneous, weak HCL reaction (Qf) 10 35 D-7 Well graded SAND, subrounded to subangular, dense, 11 gray - brown, homogeneous, strong HCL reaction (Qf) 16 (27)-12 40 D-8 13 Well graded SAND, subrounded to subangular, dense, 15 gray - brown, homogeneous, strong HCL reaction (Qf) 18 (33)13

HOLE No. MRK-1-00

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PROJECT WSDOT SR395 North Spokane Corridor Project Sheet 3 of 3

Job No. XL1154

								41	TOJCO			JOD INOXL1134		
Depth (ft)	Meters (m)	Profile	10	Pene	ndard tration ws/ft 30	40	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	Instrument
3	—14		[>> (18 29 34 (63)	X	D-9			Well graded SAND, subrounded to subangular, very dense, gray - brown, homogeneous, strong HCL reaction (Qf)	-	
50 —	15						22 25 28 (53)	X	D-10			Well graded SAND, subrounded to subangular, very dense, gray - brown, homogeneous, strong HCL reaction (Qf)		
-	16				 	 - - -							-	
55-	-17					1							-	
60 -	18			1	. 									
- - - -	- 19			 	 									
65—	-20													
70	-21		 			 							-	

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Department of Transportation

		OJECT	wst	(SB-1- OOT SR3 ane, Wa	95 Nort	th Spokai	ne Corrid	lor l	Projec	t		Job No. XL1154 S.R. 395	hoc
	Sta	ition _	386	+15.967				:	Offset	-705.	62	C.S	
	Equ	uipment	Moi	ooka M	ST-1100)			Casing	HWT	/HQ	Ground El 1932.0 (588.87 m))
	Me	thod of B	oring	HQ ca	asing ac	dvance							
	Sta	rt Date	Sept	ember 26	, 2000			Cor	mpletio	n Date	September 27, 2000	Sheet1_ of2	
	Depth (ft)	Meters (m)	Profile	10	Standar Penetrati Blows/f	ion	SPT Blows/6 (N)	Sample Type	Sample No. (Tube No.)	Lab	Dε	escription of Material	
	5-	-1		- ♦			4 4 5 (9)	X	D-1		Poorly graded fine to subangular, loose, more reaction (Qes)	medium SAND, subrounded to pist, homogeneous, weak HCL	
.GDT 2/5/01•6:24:22 P2	10-	3					7 7 8 (15)	X	D-2		Well graded SAND, so dense, grayish brown, reaction (Qf)	ubrounded to subangular, medium , moist, homogeneous, weak HCL	
SOIL I:/PROJECT/244/004.10/WDOTPH1A.GPJ WSDOT.GDT 2/5/01+6:24:22 P2	15	- 5					8 8 10 (18)	X	D-3		Well graded SAND wit to subangular, mediun homogeneous, weak h	th trace of fine gravel, subrounded in dense, grayish brown, moist, HCL reaction (Qf)	
SOIL IMPROJE	- 20	6		1	 		6	X	D-4		Well graded SAND, su	brounded to subangular, medium	

HOLE No. PRKSB-1-00

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2 XL1154

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PROJECT WSDOT SR395 North Spokane Corridor Project Job No. Sample Type Standard Sample No. (Tube No.) Depth (ft) Meters (m) SPT Instrument Profile Lab Penetration Blows/6* Description of Material Blows/ft (N) 10 20 30 40 dense, grayish brown, homogeneous, weak HCL reaction (Qf) (16) D-5 8 Poorly graded fine SAND, rounded to subrounded. 25 11 medium dense, brown, wet, homogeneous, weak HCL 12 reaction (Qf) (23)10 D-6 Poorly graded fine SAND, rounded to subrounded, 30 11 medium dense, brown, wet, homogeneous, weak HCL 10 reaction (Qf) 01/10/2001 10 35 12 40-13

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Department of Transportation

НС	DLE No.	PH1	l-1-00									Department of Trans	portati	ion
PR	ROJECT	WSD	OT SR3	95 No	rth Sp	okane	Corrido	or F	rojec	t		Job No. XL1154		
		Spok	ane, Wa	shing	ton				S.R. <u>395</u>					
Sta	Station 387+66.008						(Offset	-10.0	9	C.S			
Eq	Equipment B-61			C	Casing	8-in I	ISA	Ground El1929.6 (588.14 m						
Me	thod of B	Soring	8-in H	lollow	Stem	Auger								
Sta	art Date	Sept	ember 26	5, 2000				Con	npletio	n Date	September 26, 2000	Sheet1 of3		
Depth (ft)	Meters (m)	Profile	10	Stand Penetr Blow	ation s/ft	40	SPT Blows/6* (N)	Sample Type	Sample No.	Lab	C	Description of Material	Groundwater	Instrument
10-			•				2 2 4 (6) 9 9 10 (19)	X	D-1		Well graded fine to mand silt nodules, subdark gray, moist, hon	ight yellowish brown, dry, e organic material (tree roots, fill) medium SAND with trace of gravel angular to angular, medium dense, nogeneous (Qf) oarse SAND, subrounded to lark grayish brown, moist,		
- 20	-6		 											

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Department of Transportation

Sheet 2 of 3 Job No. XL1154

HOLE No. PH1-1-00

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PROJECT WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Meters (m) Sample No. £ (Tube No.) SPT Lab Tests Depth (Penetration Blows/6 Description of Material Blows/ft (N) 10 20 30 40 Poorly graded fine to medium SAND with silt, subangular 18 to subrounded, dense, dark grayish brown, moist, 24 homogeneous (Qf) (42)25 Poorly graded SAND subrounded to subangular, dense, D-5 16 16 dark brown, moist, homogeneous (Qf) 15 8 (31)30 D-6 Poorly graded SAND, subangular to angular, dense, dark 14 brown, moist, homogeneous (Qf) 18 (32)10 35 D-7 Poorly graded SAND, subangular to angular, dense, dark 15 brown, moist, homogeneous (Qf) 19 (34)12 40-D-8 Poorly graded SAND, subrounded to subangular, medium 11 dense, brown, moist, homogeneous (Qf) 13 (24)13

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Sheet 3 of 3 Job No. XL1154

PROJECT __WSDOT SR395 North Spokane Corridor Project

PH1-1-00

HOLE No.

Sample Type Standard Sample No. Depth (ft) Meters (m) (Tube No.) Groundwater SPT Instrument Lab Penetration Blows/6* Description of Material Blows/ft (N) 20 40 10 D-9 Poorly graded SAND, subrounded to subangular, dense, 14 brown, moist, homogeneous (Qf) 16 (30)15 50 D-10 Poorly graded SAND, subrounded to subangular, dense, 11 16 brown, moist, homogeneous (Qf) 18 16 55 - 17 -18 60 SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01+11:00:41 A2 19 65--20 -21

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Department of Transportation

HOLE No.	PRK-3-00					
PROJECT	WSDOT SR395 North Spokane Co Spokane, Washington	orridor Project		Job No. XL1154 S.R. 395	-	
Station	389+08.952	Offset	777.14	C.S		
Equipment	B-61	Casing	8-in HSA	Ground El 1927.1 (587.38 m)		
Method of E	Boring 8-in Hollow Stem Auger		····	_		
Start Date	October 24, 2000	Completion	Date October 24, 2000	Sheet1 of3		
Depth (ft) Meters (m)	Penetration Blows/#	Sample Type Sample No. (Tube No.)	Lab	Description of Material	Groundwater	
10 - 3		4 4 6 (10) D-1 6 7 9 (16) D-2 9 (16) D-3 30 42)	Silty SAND, subro brown, moist, horr	to medium SAND, subrounded to to medium dense, gray-brown, dry, HCL reaction (Qes) unded to subangular, medium dense, ogeneous, strong HCL reaction (Qf) edium dense, brown, laminated, strong o, subrounded to subangular, dense, ist, homogeneous (Qf)		

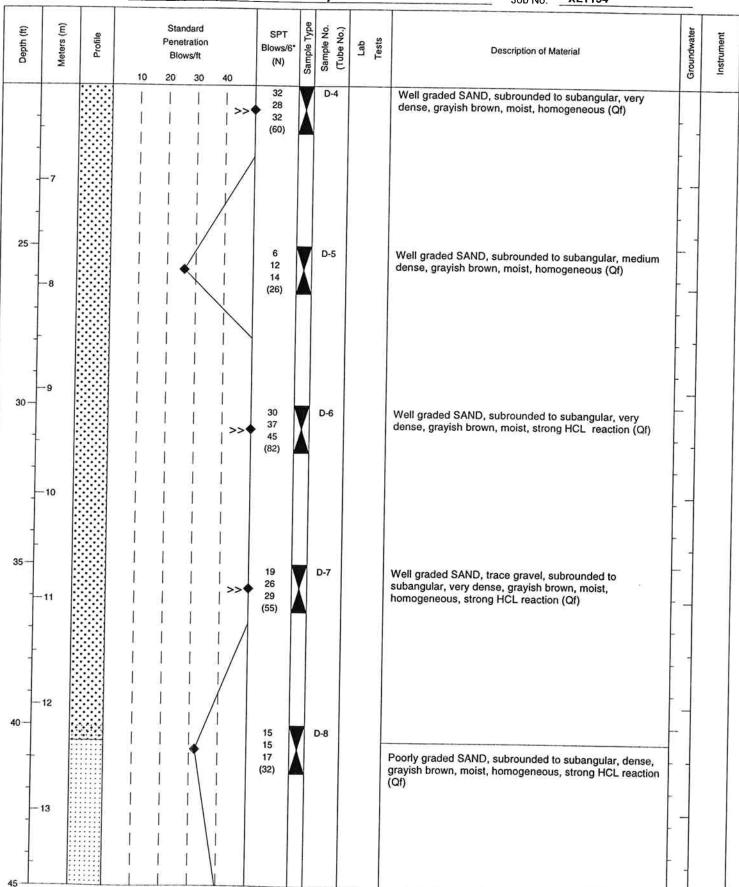
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PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 3 Job No. XL1154



HOLE No. PRK-3-00

Washington State
Department of Transportation

Sheet 3 of 3 Job No. XL1154

PROJECT _WSDOT SR395 North Spokane Corridor Project

Sample No. (Tube No.) Sample Type Meters (m) Standard Depth (ft) Groundwater SPT Lab Tests Instrument Penetration Blows/6" **Description of Material** Blows/ft (N) 10 20 30 40 Poorly graded SAND, subrounded to subangular, dense, 17 D-9 17 moist, grayish brown, homogeneous, strong HCL reaction 24 (41)-15 50 17 D-10 Poorly graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf) 18 22 (40)16 55 -17 18 60 19 65 20 -21

Washington State
Department of Transportation

HOLE No.	DP-	1-00					Department of Trans	portati	ion		
PROJECT	WSD	OT SR395 North Spokar	Job No XL1154								
	Spok	ane, Washington					S.R. 395				
Station	390-	+93.643		C	Offset	_489.	67 C.S.				
Equipment	B-6 1	ı	v-4	C	Casing	8-in l					
Method of E	Boring	8-in Hollow Stem Auge	er								
Start Date	Septe	ember 27, 2000		Com	pletion	n Date	September 27, 2000 Sheet 1 of 2				
Depth (ft) Meters (m)	Profile	Standard Penetration Blows/ft 10 20 30 40	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument		
10 — 3			9 11 10 (21) 9 16 20 (36)	X	D-2		Well graded fine to coarse SAND, medium dense, brown, dry, homogeneous (Qf) Well graded fine to coarse SAND, medium dense, brown, moist, homogeneous (Qf) Well graded fine to coarse SAND with trace of fine gravel, subrounded to rounded, dense, brown, moist, homogeneous (Qf)	-	KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK		

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HOLE No. DP- 1-00

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PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 2 Job No. XL1154

PROJEC		JOT SK395 NORTH Spokane			10,000		Job No. XL1154	_	
Depth (ft) Meters (m)	Profile	Standard Penetration Blows/ft 10 20 30 40	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
-7			15 19 19 (38)	X	D-4		Poorly graded fine to medium SAND, subrounded to rounded, dense, brown, moist, homogeneous (Qf)		
25			15 15 15 (30)	X	D-6	GS MC = 4	Poorly graded fine to medium SAND, subrounded to rounded, dense, brown, moist, homogeneous (Qf)		
30			13 15 17 (32)	X	D-7		Poorly graded fine to medium SAND, subrounded to rounded, dense, brown, moist, homogeneous (Qf)		
35								-	
								-	
40-								_	
- 13									
45								1	

Washington State
Department of Transportation

ŀ	IOLE No.	DP-	2-00								Department of Transp	ortati	on
F	ROJECT	WSD	OT SR39	95 North	Spokane	e Corrid	or P	rojec	et		Job No. XL1154		
		Spok	ane, Was	hington							S.R. 395		
S	Station	392	+71.503				C	Offset	463.	25	C.S		
E	quipment	B-6	1				C	Casing	8-in	HSA	Ground El 1922.4 (585.95 m)		
M	lethod of E	Boring	8-in Ho	ollow Ste	m Auge	r							
S	tart Date	Septe	ember 26,	2000		-	Com	pletic	n Date	September 26, 2000	Sheet1 _ of2		
Depth (ft)	Meters (m)	Profile	10	Standard Penetration Blows/ft 20 30	40	SPT Blows/6* (N)	Sample Type	Sample No.	Lab	D	escription of Material	Groundwater	Instrument
10			•		\$	3 3 4 (7)	X	D-1		Silty SAND with trace dense, brown, moist, nodules with trace cla	redium SAND with trace silt and oose, brown, dry, homogeneous, of fine gravel, subrounded, medium homogeneous; silt occurs as brown by (Qf) with trace fine gravel, rounded to brown, moist, homogeneous, (Qf) medium SAND, rounded to rown, moist, homogeneous (Qf)		

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HOLE No. DP- 2-00

PROJECT WSDOT SR395 North Spokane Corridor Project

Depth (ft)	Meters (m)	Profile	10	Penel	ndard tration ws/ft 30	40	SPT Blows/6* (N)	Sample Type	Sample No.		Lab	Description of Material	Groundwater	
-	-7		1 1 1 1 1		† 		12 14 16 (30)	X	D-4			Poorly graded, fine to medium SAND,rounded to subrounded, dense, brown, moist, homogeneous (Qf)	-	
25	-8		1 1 1 1 1				18 21 23 (44)	X	D-5	1	GS MC = 2	Poorly graded, fine to medium SAND,rounded to subrounded, dense, brown, moist, homogeneous (Qf)	-	
30-	-9 -10		1 1 1		+		14 14 16 (30)	X	D-6			Poorly graded, fine to medium SAND,rounded to subrounded, dense, brown, moist, homogeneous (Qf)		
35-	-11				 									
40-	-12			1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1									
	- 13				İ İ İ								_	

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	WSDOT SR395 North Spokan Spokane, Washington		Job No. XL1154 S.R. 395	
Station	393+64.129	Offset 1.00	C.S	
Equipment	B-61	Casing 8-in h	HSA Ground El1925.8 (586.98 m	1)
Method of E	oring 8-in Hollow Stem Auge	er		
Start Date	September 27, 2000	Completion Date	<u>September 27, 2000</u> Sheet <u>1</u> of <u>3</u>	
Depth (ft) Meters (m)	Standard Penetration Blows/ft 10 20 30 40	Sample Type Sample No. (Tube No.)	Description of Material	Groundwater
10 — 3 10 — 3		12 D-1 16 50/2* D-2 12 13 (25) D-3 12 14 (26)	Well graded SAND, subrounded to subangular, very dense, very dark grayish brown, moist, homogeneous, strong HCL reaction (Qes) Poorly graded fine to medium SAND, subrounded to subangular, dense, very dark grayish brown, moist, homogeneous, strong HCL reaction (Qf) Poorly graded fine SAND, subrounded to subangular, dense, very dark grayish brown, moist, homogeneous, strong HCL reaction (Qf)	

HOLE No. PRK-1-00

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Department of Transportation

Sheet 2 of 3 Job No. XL1154

PROJECT __WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Meters (m) Sample No. (Tube No.) Groundwater Depth (ft) SPT Instrument Profile Tests Penetration Lab Blows/6' Description of Material Blows/ft (N) 10 20 30 40 12 D-4 Poorly graded fine SAND, subrounded to subangular, dense, very dark grayish brown, moist, homogeneous, 15 16 strong HCL reaction (Qf) (31)25 D-5 22 Well graded fine to medium SAND, subrounded to 23 subangular, dense, very dark grayish brown, moist, 23 homogeneous, strong HCL reaction (Qf) (46) 30 D-6 10 Well graded fine to medium SAND, subrounded to 13 subangular, dense, very dark grayish brown, moist, 14 homogeneous, strong HCL reaction (Qf) (27) 10 35 D-7 11 Poorly graded fine SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction 15 INPROJECT/244/004,10/WDOTPH1A.GPJ WSDOT.GDT 2/1/01+11:02:34 A2 14 (Qf) (29)40 20 D-8 Well graded SAND with gravel, subangular to 34 subrounded, very dense, very dark grayish brown, moist, 32 homogeneous, strong HCL reaction (Qf) (66)13

HOLE No. PRK-1-00

Washington State
Department of Transportation

PROJECT WSDOT SR395 North Spokane Corridor Project Job No. XL1154

Depth (ft)	Meters (m)	Profile	10	Pene	ndard tration ws/ft 30	40	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	Instrument
-	14				 		15 19 22 (41)	X	D-9			Well graded SAND with trace of gravel, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
50 —	—15 -		 			•	10 19 24 (43)	X	D-10			Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)	-	
-	—16					 							-	
55—	-17												-	
60	18													
65 —	— 19			 									-	
65 —	-20			 	1 1 1									
1	-21					-							-	

НО	LE No.	PRI	K-2-00							Department of Transp	ortatio	on
PR	OJECT	WSE	OOT SR395 Nort	h Spokane	e Corrido	or P	roject	t		Job No. XL1154		
		Spok	ane, Washingto	n						S.R 395		
Sta	tion _	396	+12.323			c	Offset	1.96		C.S		
Equ	uipment	B-6	1			c	Casing	8-in l	HSA	Ground El1926.1 (587.08 m)		
Met	thod of E	Boring	8-in Hollow S	tem Auge	r							
Sta	rt Date	Sept	ember 28, 2000			Com	npletion	n Date	September 28, 2000	Sheet1 of3		
Depth (ft)	Meters (m)	Profile	Standari Penetrati Blows/ft 10 20 3	on	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	ı	Description of Material	Groundwater	Instrument
10-					4 5 6 (11)	X	D-1		Poorly graded fine S. subangular, medium strong HCL reaction	AND with trace of silt, subrounded to dense, brown, moist, homogeneous, (Qes) medium SAND, subrounded to grayish brown, moist, homogeneous,		
-	-6		1 1 1				ĺ					

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HOLE No. PRK-2-00

Washington State
Department of Transportation

Sheet 2 of 3 Job No. XL1154

PROJECT __WSDOT SR395 North Spokane Corridor Project

Depth (ft) Meters (m)	Profile	Standard Penetration Blows/ft 0 20 30 40	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	
-7			12 15 14 (29)	X	D-4			Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous (Qf)		
25	×		10 18 18 (36)	X	D-5			Elastic SILT, very stiff, light yellowish brown, moist, \laminated, no HCL reaction (Qf)	-	
30 9			11 13 16 (29)	X	D-6			Well graded SAND, subrounded to subangular, dense, grayish brown, moist, strong HCL reaction (Qf)	_	
35-			10 13 16 (29)	X	D-7	ve		Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
-12 40 -			10 10 8 (18)	X	D-8			Well graded SAND, subrounded to subangular, medium dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf) Elastic SILT, medium dense, light yellowish brown, moist, strong HCL reaction (Qf) Well graded fine to medium SAND with trace silt and gravel, subrounded to subangular, medium dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		

HOLE No. PRK-2-00

Washington State
Department of Transportation

Sheet 3 of 3

Depth (ft)	Meters (m)	Profile	10	Stan Penet Blov	ration	40	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	
-	14						13 18 23 (41)	X	D-9			Well graded SAND, subangular to subrounded, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
50 —	15 					>>	19 21 41 (62)	X	D-10			Well graded SAND with gravel, subrounded to subangular, very dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)	- -	
-	16													
55-	17													
60 —	18					 								
-	19													
65-	-20												-	
	-20													
_	-21		İ	 								_	-	

Washington State
Department of Transportation

HOLE No.	PH1-2-00		Separation of Transportation
PROJECT	WSDOT SR395 North Spoka	ne Corridor Project	Job NoXL1154
	Spokane, Washington		S.R. 395
Station	403+06.479	Offset -24. 1	
Equipment	B-61	Casing 8-in	
Method of Bo			- TOOSIE (COORDE III)
Start Date	September 28, 2000		Ocation to a constant of the c
Start Date	September 26, 2000	Completion Date	<u>September 28, 2000</u> Sheet <u>1</u> of <u>2</u>
Depth (ft) Meters (m)	Standard Penetration Blows/ft 10 20 30 40	(N) (a) (b) Sample Type Sample No. (Tube No.)	Groundwater Groundwater Instrument
10 -3		3 3 D-1 3 3 (6) D-2 6 7 (13) D-3 12 10 (22)	Poorly graded SAND, subrounded to subangular, medium dense, grayish brown, moist, strong HCL reaction (Qes) Poorly graded SAND, subrounded to subangular, medium dense, grayish brown, moist, strong HCL reaction (Qes) Poorly graded SAND, subrounded to subangular, medium dense, grayish brown, moist, strong HCL reaction (Qes) SILT, stiff, moist, grayish brown (Qf) Poorly graded SAND, subrounded to subangular, medium dense, grayish brown, moist, strong HCL reaction (Qes) SILT interbedded with lean clay, stiff, moist, light yellowish brown, stratified (Qf)

SOIL I:\PROJECT244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01+11:00:51 A2

HOLE No. PH1-2-00

Washington State
Department of Transportation

Sheet 2 of 2 Job No. XL1154

PROJECT _ WSDOT SR395 North Spokane Corridor Project

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft 10 20 30	40	SPT Blows/6* (N)	Sample Type		Lab	lests	Description of Material	Groundwater	
	- 7			>>4	19 28 28 (56)	X	D-4			Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)	-	
25	-8	**************************************		 	5 14 50/4*	X	D-5			SILT, hard, light yellowish brown, wet, homogeneous, no HCL reaction (Qf) Elastic SILT (Qf)		
30	9 10				11 17 24 (40)	X	D-6			Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)	-	
35	-11											
40	-12											
45	-13											

Washington State
Department of Transportation

Spokane, Washington S.R. 395		
Station		
Equipment B-61 Casing 8-in HSA Ground El 1917.3 (584.39 m)		
Method of Boring Start Date September 28, 2000 Completion Date September 28, 2000 Sheet 1 of 2 Standard Penetration Blows/ft 10 20 30 40 SPT Start Date September 28, 2000 Sheet 1 of 2 Description of Material Description of Material Well graded SAND with trace gravel, subrounded to subangular, medium dense, grayish brown, dry, homogeneous (Qes)		
Start Date September 28, 2000		
Standard Penetration Blows/h 10 20 30 40 SPT Blows/6' and during graph of the subangular, medium dense, grayish brown, dry, homogeneous (Qes) Standard Penetration Blows/h 10 20 30 40 SPT Blows/6' and during graph of the subangular, medium dense, grayish brown, dry, homogeneous (Qes)		
Standard Penetration Blows/ft 10 20 30 40 SPT Blows/G(N) and blows		
Well graded SAND with trace gravel, subrounded to subangular, medium dense, grayish brown, dry, homogeneous (Qes)	Groundwater	
Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous (Qes)		
15—		
Poorly graded fine to medium SAND, subrounded to subangular, medium dense, grayish brown, moist, homogeneous (Qes)	_	
Silty clayey SAND, subrounded to subangular, brown, medium dense, moist, homogeneous, strong HCL reaction (Qf)		

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Department of Transportation

HOLE No. PH1-3-00

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PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 2 Job No. XL1154

Depth (ft)	Meters (m)	Profile	10	Standard Penetratio Blows/ft 20 30	n	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	lests	Description of Material	Groundwater	Instrument
-	-7		 		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	8 10 11 (21)	X	D-5			Well graded SAND, subrounded to subangular, medium dense, grayish brown, moist, homogeneous (Qf)		
25 —	-8		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			11 11 13 (24)	X	D-6			Well graded SAND, rounded to subrounded, medium dense, grayish brown, moist, homogeneous (Qf)		
30	-9					10 13 18 (31)	X	D-7			Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous (Qf)	-	
35-	- 10				1 1 1 1							- 1	
-	-11		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1										
40-	-12		I I I									-	
45	-13		 -		 							-	

Washington State
Department of Transportation

Spokane, Washington	PROJECT	WSDOT SR395 North Spok	ne Corridor Project		Job NoXL1154	
Equipment B-61 Casing B-in HSA Ground El 1907.9 (581.53 m)		Spokane, Washington			S.R. 395	
Method of Boring Start Date September 29, 2000 Completion Date September 29, 2000 Sheet 1 of 2 Standard Penetration Blows/ft 10 20 30 40 Place of the completion of Material Description of Material	Station	421+40.061	Offset	2.60	C.S	
Start Date September 29, 2000 Sheet 1 of 2	Equipment	B-61	Casing	8-in HSA	Ground El1907.9 (581.53 m)	
Standard Penetration Blows/it 10 20 30 40	Method of Bo	oring 8-in Hollow Stem Au	ger		-	
10 20 30 40	Start Date	September 29, 2000	Completion	Date September 29, 200	0 Sheet 1 of 2	
Well graded fine to medium SAND, subrounded to subangular, medium Gense, grayish brown, moist, homogeneous (Qes) Well graded fine to medium SAND, subrounded to subangular, dense, grayish brown, homogeneous (Qes) Well graded fine to medium SAND, subrounded to subangular, dense, grayish brown, homogeneous (Qes) Poorly graded SAND, subrounded to subangular, dense, grayish brown, homogeneous (Qes)	Depth (ft) Meters (m)	Penetration Blows/ft	Sample Type Sample No. (Tube No.)	Lab	Description of Material	Groundwater
	10-3		10 15 17 (32) D-2 15 17 (32) D-3 16 19	well graded fine to subangular, dense	Im dense, grayish brown, moist, es) o medium SAND, subrounded to, grayish brown, homogeneous (Qes)	

HOLE No. PH1-4-00

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Washington State
Department of Transportation

Sheet 2 of 2 Job No. XL1154

PROJECT __WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Meters (m) Sample No. (Tube No.) Groundwater Depth (ft) SPT Instrument Lab Tests Penetration Blows/6* Description of Material Blows/ft (N) 20 30 Silty SAND, subrounded to subangular, medium dense, 13 brown, moist, homogeneous (Qf) 8 MC = 27(21) ΑL Lean CLAY very stiff, light yellowish brown, moist, fining upward (Qf) 25 48 D-5 30 Well graded SAND, subrounded to subangular, very 40 dense, grayish brown, moist, homogeneous (Qf) 30 10 35 -12 40-13

Washington State
Department of Transportation

HOLE No.	PH1-5-00		Department of Transpor	tation
PROJECT	WSDOT SR395 North Spok	ane Corridor Project	Job No. XL1154	-
	Spokane, Washington		S.R. 395	
Station _	434+15.809	Offset	-0.40 C.S.	
Equipment	B-61	Casing _8	8-in HSA Ground El 1908.8 (581.80 m)	
Method of E	Boring 8-in Hollow Stem Au	iger		
Start Date	September 29, 2000	Completion Da	ate September 29, 2000 Sheet 1 of 2	
Depth (ft) Meters (m)	Standard Penetration Blows/ft 10 20 30 40	Sample Type Sample No. (Tube No.)	Description of Material	Groundwater
10-3		4 D-1 4 5 (9) 8 D-2 13 21 (34) 9 D-3 14 17 (31)	Well graded SAND, subrounded to subangular, loose, brown, dry, homogeneous, no HCL reaction (Qes) Well graded fine to coarse SAND with trace of gravel, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qes) Well graded fine to coarse SAND with trace of fine gravel, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction, some sand cemented to gravel (Qf)	

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Washington State Department of Transportation

Figure A-13 Page (2 of 2)

XL1154 Job No.

WSDOT SR395 North Spokane Corridor Project PROJECT

PH1-5-00

HOLE No.

IAPROJECT/244/004.10/WDOTPH1A.GPJ WSDOT.GDT 2/1/01+11:01:22 A2

Sample Type Standard (Tube No.) Depth (ft) Sample No. Meters (m) SPT Instrument Tests Penetration Lab Blows/6" **Description of Material** Blows/ft (N) 10 20 30 40 Poorly graded fine to medium SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous 13 16 (29)25 D-5 Sandy SILT, medium dense, light yellowish brown, moist 8 14 Fine silty SAND, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf) 16 (30)Lean CLAY, stiff, moist, strong HCL reaction (Qf) 30 5 D-6 Lean CLAY with sand, stiff, wet, laminations fining 10 upward,strong HCL reaction (Qf) 28 MC = 26 Well graded SAND, subrounded to subangular, dense, (38) grayish brown, moist, homogeneous, strong HCL reaction 10 35 12 40-13

Washington State
Department of Transportation

1:	11			(a) (b)						
-5	4 	0-3	5	Meters (m)	Method of 8 Start Date	Equipment	Station _		PROJECT	HOLE No.
•		•	↑	Profile	October 4		443+91.	Spokane,	WSDOT	PH1-6-0
				Stand Penetr Blow	Q casing	a MST-110		Washing	SR395 No	00
				ation	advance			ton	orth Spoka	
3 3 2	2 2 2 (4)	3 2 3 (5)	3 2 4 (6)	SPT Blows/6* (N)					ane Corrid	
X	X	X	X	Sample Type	Con	(or F	
D-4	D-3	D-2	D-1	Sample No. (Tube No.)	npletion	Casing	Offset		Projec	
				Lab	n Date	_HWT	69.63		t	
Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous,	Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)	Poorly graded fine to medium SAND, subrounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)	Poorly graded fine to medium SAND, subrounded to subangular, loose, grayish brown, homogeneous (Qes) Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)	Description of Material	October 5, 2000 Sheet 1 of 5	/HQ Ground EI 1941.7 (591.83 m)		S.R. 395	Job No XL1154	Department of Transp
				Groundwater						опан
K	AND AND AND AND AND AND AND AND AND AND	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	ACCESSES CONTRACTOR CO	lostrimon						on
	\$255555 \$255	ACCOCACACACACACACACACACACACACACACACACAC	**************************************	IIISIIAIIIAIII		ē	ŧ	_		

HOLE No. PH1-6-00

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Washington State
Department of Transportation

Sheet 2 of 5 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

Standard Sample Type Depth (ft) Meters (m) Sample No. (Tube No.) Groundwater SPT Instrument Lab Penetration Blows/6* Description of Material Blows/ft (N) 20 30 40 (5) weak HCL reaction (Qes) D-5 Poorly graded fine to medium SAND, rounded to 3 subangular, loose, grayish brown, wet, homogeneous, 3 weak HCL reaction (Qes) 25 (6) 3 D-6 Poorly graded fine to medium SAND, rounded to subangular, loose, wet, homogeneous, weak HCL 3 reaction (Qes) 30 (6) 10 D-7 3 Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous, 5 weak HCL reaction (Qes) 35 (8) D-8 Poorly graded fine to medium SAND, rounded to 12 5 subangular, medium dense, grayish brown, wet, 6 homogeneous, weak HCL reaction (Qes) 40 (11)D-9 Poorly graded medium to coarse SAND, rounded to 11 subangular, medium dense, grayish brown, wet, weak

HOLE No. PH1-6-00

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PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 3 of 5 Job No. XL1154

	DJECI	1	OT SHOES NOTES Spokane	·				Job NoXL1154	_	
Depth (ft)	Meters (π)	Profile	Standard Penetration Blows/ft 10 20 30 40	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	14			(23)	×			HCL reaction (Qf)		SSSSSSS
50 —	— 15			7 15 19 (34)	X	D-10		Poorly graded medium SAND, rounded to subangular, dense, grayish brown, wet, homogeneous, weak HCL reaction (Qf)		
55 —	-16			11 13 15 (28)	X	D-11		Poorly graded fine to medium SAND, rounded to subangular, dense, grayish brown, wet, homogeneous, strong HCL reaction (Qf)		
60	- 17 - 18			6 12 16 (28)	X	D-12	MC = 39 AL	Silty SAND, loose, brown, wet, strong HCL reaction (Qf) Lean CLAY, stiff, light brown, moist, strong HCL reaction (Qf) Poorly graded fine to medium SAND, rounded to subangular, dense, grayish brown, wet, homogeneous,	_	
-	-19							strong HCL reaction (Qf)		
65 —	-20			24 , 34 , 45 (79)	X	D-13		Well graded SAND with gravel, rounded to subangular, very dense, light brownish gray, wet, homogeneous, strong HCL reaction (Qf)		
70	-21			16 17 21	X	D-14		Well graded SAND, rounded to subangular, dense, light brownish gray, wet, homogeneous, strong HCL reaction (Qf)	- 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

PH1-6-00

Washington State
Department of Transportation

Sheet 4 of 5 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

HOLE No.

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Sample Type Standard Depth (ft) Sample No. Meters (m) (Tube No.) SPT Profile Tests Penetration Blows/6" Description of Material Blows/ft (N) 10 20 30 40 (38)22 14 D-15 Well graded SAND, rounded to subangular, dense, wet, 16 homogeneous, weak HCL reaction (Qf) 19 75 (35)-23 D-16 15 No recovery--trace of coarse SAND in sampler 16 26 80 (42)25 Well graded SAND, rounded to subangular, dense, 15 D-17 16 grayish brown, wet, homogeneous, weak HCL reaction 17 85 (33)26 12/6/2000 27 12/15/2000 D-18 19 No recovery--trace of coarse sand in sampler (Qf) 18 19 90 (37)28 Well graded SAND, rounded to subangular, dense, D-19 17 grayish brown, wet, homogeneous, weak HCL reaction 17

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HOLE No. **PH1-6-00**

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PROJECT WSDOT SR395 North Spokane Corridor Project

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Figure A-14 Page (5 of 5)

Depth (ft)	Meters (m)	Profile	10	Penel	idard tration ws/ft 30	40	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	Instrument
-	29						17 17 17 22	Y	D-20			Well graded SAND, rounded to subangular, dense, grayish brown, wet, homogeneous, strong HCL reaction (Qf)		
100	-31						(39)							
105	-32												-	
	-33												_	
110	-34			 	: 									
115	-35				! 								-	
120	-36				 								-	

Washington State
Department of Transportation

HOLE No.	DP- 3-00			Department of Transp	ortatio	on
PROJECT	WSDOT SR395 North Spok	ane Corridor Projec		Job NoXL1154		
	Spokane, Washington			S.R. <u>395</u>		
Station	447+99.231	Offset	549.44	C.S		
Equipment	B-61	Casing	8-in HSA	Ground El1900.3 (579.21 m)		
Method of B	oring 8-in Hollow Stem Au	ıger				
Start Date	October 2, 2000	Completion	n Date	Sheet 1 of 3		
Depth (ft) Meters (m)	Standard Penetration Blows/ft 10 20 30 40	(Z) (A) LAS Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
SOIL I:PROJECT244004.10WDOTPH1A.GPJ WSDOT.GDT 2/5/01-6:03:07 P2		5 6 6 6 (12) D-1 (19) D-2 10 (19) D-3 6 11 (17)	Sandy SILT, loose, SILT, loose, brown, GS MC = 30 GS MC = 30 CLAY with interbeddy brown, moist to wet (Qf) SAND lense CLAY with interbeddy	subrounded to subangular, medium homogeneous, no HCL reaction (Qf) subrounded to subangular, medium yn, dry, weak HCL reaction (Qf) brown, moist, no HCL reaction (Qf) moist, no HCL reaction (Qf) ded sand, very stiff, pale brown and blocky, stratified, no HCL reaction ded sand, very stiff, pale brown, ied, no HCL reaction (Qf)		

Washington State
Department of Transportation

HOLE No. DP- 3-00

PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 3 Job No. XL1154

Depth (ft)	Meters (m)	Profile	10	Penel	ndard tration ws/ft 30	40	SPT Blows/6' (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	
1	-7		 	1	I I I I	1	19 21 25 (46)	X	D-4			Poorly graded SAND with gravel, subrounded to subangular, dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)		
25-	-8						15 50/5*	X	D-5			Poorly graded SAND with gravel, subrounded to subangular, very dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)	-	
30-	-9						12 25 30 (55)	X	D-6			Poorly graded SAND with gravel, subrounded to subangular, very dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)		
35-	-10						15 20 27 (47)	X	D-7			Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction (Qf)		
40 -	-12						13 20 21 (41)	X	D-8			Poorly graded SAND, subrounded to subangular, dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)		
.	-13		I I I I	1	 								-	

HOLE No. DP- 3-00

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Sheet 3 of 3 Job No. XL1154

PROJECT _WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Meters (m) Sample No. Depth (ft) (Tube No.) SPT Instrument Profile Lab Penetration Blows/6" Description of Material Blows/ft (N) 10 20 30 40 11 D-9 Poorly graded SAND, subrounded to subangular, dense, 20 very dark gray, moist, homogeneous, strong HCL raction 14 25 (45)-15 50 D-10 Poorly graded SAND, subrounded to subangular, very 15 45 dense, very dark gray, moist to dry, homogeneous, strong 26 GS HCL reaction (Qf) (71)MC = 1 16 55 14 D-11 Poorly graded SAND, subrounded to subangular, dense, 22 very dark gray, moist, homogeneous, strong HCL -17 27 reaction (Qf) (49)-18 60 Poorly graded SAND, subrounded to subangular, very dense, moist, homogeneous, weak HCL reaction (Qf) 24 D-12 29 31 01/08/2001 (60)12/15/2000 19 65--20 -21

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Department of Transportation

HOLE No. PH1-7-00			Department of Transportation
PROJECT WSDOT SR395 North Spokane Core	ridor Project		Job No. XL1154
Spokane, Washington			S.R. 395
Station 450+49.259	Offset	10.66	C.S
Equipment B-61	Casing	8-in HSA	Ground El1909.2 (581.92 m)
Method of Boring 8-in Hollow Stem Auger			
Start Date October 2, 2000	Completion	Date October 2, 2000	Sheet 1 of 4

Depth (ft)	Meters (m) Profile	10	Stand Penetr Blow	ration vs/ft	40	SPT Blows/6* (N)	Sample Type	Sample No.	Tests	Description of Material	Groundwater	Instrument
10 - 5	2	10	20			3 3 4 (7) 5 5 7 (12)	X	D-2		Poorly graded SAND, subrounded to subangular, loose, brown, dry, homogeneous, no HCL reaction (Qes) Poorly graded SAND, subrounded to subangular, medium dense, brown, dry, homogeneous, weak HCL reaction (Qes) Poorly graded SAND, subrounded to subangular, medium dense, brown, moist, homogeneous, strong HCL reaction (Qes)		

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HOLE No. PH1-7-00

Sheet 2 of 4 Job No. XL1154

PROJECT _WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Meters (m) Sample No. (Tube No.) Groundwater E SPT Instrument Profile Depth (Tests Penetration Lab Blows/6* Description of Material Blows/ft (N) 30 Poorly graded SAND, subrounded to subangular, medium D-4 5 dense, brown, moist, homogeneous, strong HCL reaction 7 (Qes) (12)25 6 D-5 Poorly graded SAND, subrounded to subangular, medium 6 dense, brown, moist, homogeneous, strong HCL reaction 6 (Qes) (12)30 Poorly graded SAND, subrounded to subangular, medium D-6 6 dense, brown, moist, homogeneous, weak HCL reaction 7 (Qes) (13)35 D-7 Well graded SAND, subrounded to subangular, medium 9 dense, brown, moist, homogeneous, strong HCL reaction INPROJECT/244/004.10/WDOTPH1A.GPJ WSDOT.GDT 2/1/01+11:02:02 A2 14 (Qes) (23) 12 40 19 D-8 Well graded SAND, subrounded to subangular, dense, 24 very dark gray, moist, homogeneous, strong HCL 24 reaction (Qf) (48)

HOLE No. PH1-7-00

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Sheet 3 of 4 Job No. XL1154

PROJECT _WSDOT SR395 North Spokane Corridor Project

Depth (ft) Standard Sample No. Meters (m) SPT (Tube No.) Groundwater Lab Penetration Blows/6* Sample Description of Material Blows/ft (N) 20 30 40 25 D-9 Well graded SAND, subrounded to subangular, very >> 50/1 dense, very dark gray, moist, homogeneous, strong HCL reaction (Qf) 15 50 Well graded SAND, subrounded to subangular, very 13 D-10 19 dense, very dark gray, moist, homogeneous, strong HCL 19 reaction (Qf) (38)16 55 21 D-11 Well graded SAND, subrounded to subangular, very 33 dense, very dark gray, moist, homogeneous, strong HCL 37 reaction (Qf) (70)18 60 D-12 25 Well graded SAND, subrounded to subangular, very 29 dense, very dark gray, moist, homogeneous, strong HCL 33 reaction (Qf) (62) 65 D-13 Well graded SAND, subrounded to subangular, very 20 31 dense, grayish brown, moist, homogeneous, strong HCL 33 reaction (Qf) (66)

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HOLE No. PH1-7-00

PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 4 of 4 Job No. XL1154

Depth (ft)	Meters (m)	Profile		Pene Blo	ndard tration ws/ft	**	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	
	-22		10	20	 	>>40	21 25 27 (52)	X	D-14			Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)	-	
75-	-23						22 26 29 (55)	X	D-15			Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)	- - -	
80 —	-24		I I I I I				15 24 26	Y	D-16			Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous (Qf)	- - - -	
-	25	*****	1	T I I	T I I	I	(50)						-	
85 —	26			Ĭ Ĭ I	1 1 1 1	1 1 1 1 1 1 1 1								
90-	-27] 		1 1 1 1 1									
-	28		1 1 1 1 1		1 1 1 1 1 1 1	 							-	
			1	ļ ļ]	1							-	

Washington State
Department of Transportation

HOLE No.	FARWSB	-1-00					Departr	nent of Transpo	ortati	on
PROJECT	WSDOT SR	395 North Spol	kane Corrido	or F	roject		Job No. XL1154			
	Spokane, W	ashington					S.R. 395			
Station _	453+97.587	7		C	Offset	-409.	C.S			
Equipment	B-61			C	Casing	8-in H	SA Ground El 1861.	0 (567.23 m)		
Method of B	oring 8-in	Hollow Stem A	uger							
Start Date	October 4, 2	000		Con	npletion	n Date	October 4, 2000 Sheet 1 of	2		
Depth (ft) Meters (m)	Profile 10	Standard Penetration Blows/ft 20 30 40	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material		Groundwater	
-1 -2 -2 -4 -15-			4 3 4 (7) 4 6 (10)	X	D-1		Poorly graded SAND, subrounded to subang brown, dry, homogeneous, no HCL reaction of the subang medium dense, brown, moist, homogeneous reaction (Qes) Poorly graded SAND, subrounded to subang medium dense, brown, moist, homogeneous reaction (Qes)	ular, loose to , weak HCL		

HOLE No. FARWSB-1-00

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SOIL

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Sheet 2 of 2 Job No. XL1154

PROJECT __WSDOT SR395 North Spokane Corridor Project

Standard Sample Type Depth (ft) Sample No. Meters (m) (Tube No.) SPT Instrument Tests Penetration Lab Blows/6* Description of Material Blows/ft (N) 10 20 30 40 D-4 Poorly graded SAND, subrounded to subangular, loose to medium dense, brown, moist, homogeneous, weak HCL 5 5 reaction (Qes) (10)25 Poorly graded SAND, subrounded to subangular, medium D-5 9 dense, brown, homogeneous, strong HCL reaction (Qes) 10 (19)30 D-6 Silty SAND, subrounded to subangular, medium dense, 8 brown, moist, homogeneous, weak HCL reaction (Qf) 10 (18)10 35 D-7 10 Well graded SAND, subrounded to subangular, dense, 12 very dark grayish brown, moist homogeneous, weak HCL 17 reaction (Qf) (29)Silty SAND, subrounded to subangular, brown, moist (Qf) 12 40-D-8 5 Lean CLAY, very stiff, olive brown, weak HCL reaction 7 13 12/15/2000 & 01/08/2001 (20)Silty SAND, subrounded to subangular, medium dense, brown, moist, homogeneous (Qf) 13

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Figure A-18 Page (1 of 3)

DP- 4-00 HOLE No. PROJECT WSDOT SR395 North Spokane Corridor Project XL1154 Job No. Spokane, Washington S.R. 395 456.24718 Station Offset -648.09 C.S. B-61 Equipment Casing 8-in HSA Ground El 1856.9 (565.98 m) 8-in Hollow Stem Auger Method of Boring Sheet Start Date October 4, 2000 Completion Date October 4, 2000 Sample Type Standard Sample No. (Tube No.) Meters (m) € SPT Instrument Profile Penetration Lab Tests Depth Blows/6* Description of Material Blows/ft (N) 10 20 30 40 D-1 Poorly graded SAND, subrounded to subangular, loose, 2 3 brown, dry, homogeneous, weak HCL reaction (Qes) 5 (8) -2 10 Poorly graded SAND, subrounded to subangular, loose, D-2 4 brown, moist, homogeneous, strong HCL reaction (Qes) 15 D-3 Poorly graded SAND, subrounded to subangular, loose, brown, moist, homogeneous, strong HCL reaction (Qes) 5 -5

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HOLE No. DP- 4-00

PROJECT _ WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 3 Job No. XL1154

	Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft 10 20 30 40	SPT Blows/6* (N)	Sample Type	Sample No.	Lab Tests	Description of Material	Groundwater	Instrument
		-7			3 4 5 (9)	X	D-4		Poorly graded SAND, rounded to subrounded, loose, brown, moist, homogeneous, strong HCL reaction (Qes)	-	
	25-	-8 -9			10 12 13 (25)	X	D-5		Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction (Qes)		
	30 -	-10	x		9 8 10 (18)	X	D-6		Silty SAND, subrounded to subangular, medium dense, brown, moist, homogeneous, strong HCL reaction (Qf)		
V 5	35	-11	× × × × × × × × × × × × × × × × × × ×		6 8 12 (20)	X	D-7	GS MC = 33	Elastic SILT with sand, medium dense, brown, moist, blocky, strong HCL reaction (Qf)		
OIL INPROJECTI244/004,10/WDOTPH1A	45	-13			8 8 11 (19)	X	D-8	GS MC = 42	Lean CLAY, very stiff, brown, moist, homogeneous, weak HCL reaction (Qf) Lean CLAY, stiff, light yellowish brown, moist, homogeneous, strong HCL reaction (Qf)		

Washington State Department of Transportation

Sheet 3 of XL1154 Job No.

WSDOT SR395 North Spokane Corridor Project **PROJECT**

HOLE No.

DP- 4-00

Sample Type (Tube No.) Groundwater Standard Sample No. Meters (m) Depth (ft) SPT Instrument Tests Penetration Lab Blows/6* Description of Material Blows/ft (N) 10 20 30 Lean CLAY, stiff, light yellowish brown, moist, homogeneous, strong HCL reaction (Qf) D-9 6 GS (10)MC = 50 15 50 D-10 17 Poorly graded SAND, dense, brown, 18 homogeneous, strong HCL reaction (Qf) 17 GS MC = 2 (35)16 55 -17 -18 60 SOIL IAPROJECT244/004.10/WDOTPH1A.GPJ WSDOT.GDT 2/1/01-10:58:39 A2 -19 65 20 21

Washington State

Department of Transportation FARW-1-00 HOLE No. XL1154 PROJECT WSDOT SR395 North Spokane Corridor Project Job No. Spokane, Washington S.R. 395 Station 456+98.566 Offset -2.65 C.S. Equipment B-61 8-in HSA Casing Ground El 1847.5 (563.12 m) Method of Boring 8-in Hollow Stem Auger Start Date October 4, 2000 Completion Date Sheet October 4, 2000 Sample Type Standard Sample No. (Tube No.) Meters (m) 3 SPT Profile Lab Penetration Depth Blows/6 Description of Material Blows/ft (N) 10 20 30 40 D-1 Poorly graded SAND, subrounded to subangular, loose, 3 brown, dry, homogeneous, no HCL reaction (Qes) 5 (8)-2 10-D-2 Poorly graded SAND, subrounded to subangular, loose to medium dense, brown, moist, homogeneous, weak HCL 6 reaction (Qes) (10)15 D-3 Poorly graded SAND, subrounded to subangular, medium 8 dense, brown, moist, homogeneous, weak HCL reaction 8 (Qes) (16)-5

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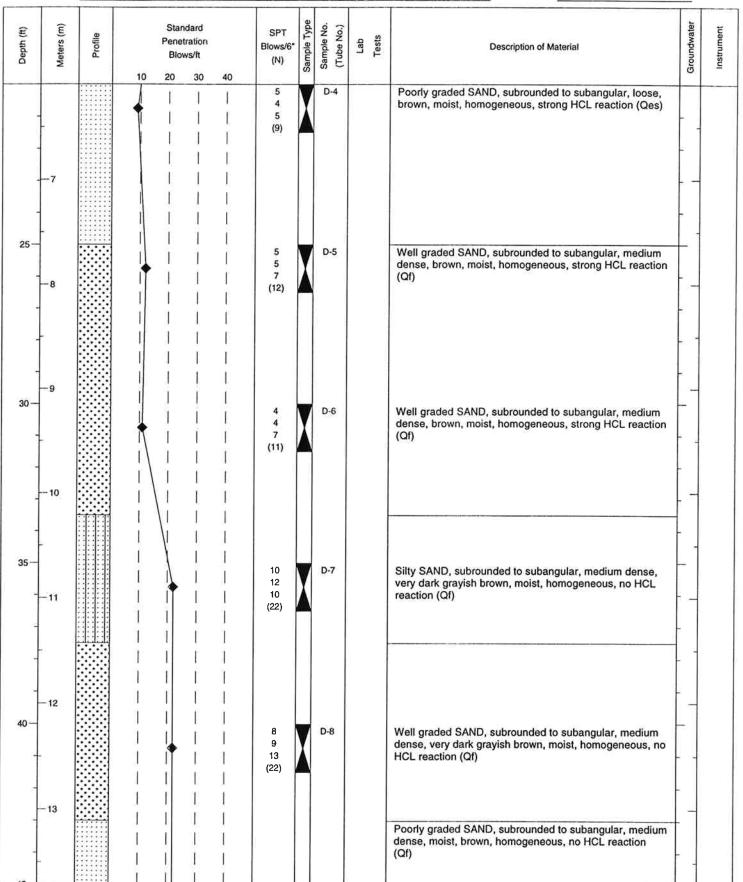
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Department of Transportation

HOLE No. FARW-1-00

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PROJECT _WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 3 Job No. XL1154



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Department of Transportation

Figure A-19 Page (3 of 3)

HOLE No. FARW-1-00

PROJECT _WSDOT SR395 North Spokane Corridor Project

Sheet <u>3</u> of <u>3</u> Job No. <u>XL1154</u>

Depth (ft)	Meters (п)	Profile	Standard Penetration Blows/ft 10 20 30 40	SPT 5 5 5 5 5 5 5 5 5	sample type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	1
	-14			9 9 13 (22)		D-9			Silty SAND, subangular to rounded, medium dense, brown, wet, homogeneous, no HCL reaction (Qf)		
50 —	-15			7 9 7 (16)		D-10			Silty SAND, subangular to rounded, medium dense, brown, wet, homogeneous, no HCL reaction (Qf)	-	
1	-16									-	
55 —	-17									-	
60	-18									-	
-	-19										
65	-20										
-	-21									-	

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Department of Transportation

HOLE No. FARW-2-00

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Department of Transportation

Figure A-20 Page (2 of 3)

Sheet 2 of 3 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

Standard Meters (m) Sample No. (Tube No.) Groundwater £ SPT Instrument Profile Penetration Tests Depth (Lab Sample Blows/6* Description of Material Blows/ft (N) 20 30 40 Well graded SAND, subrounded to rounded, loose, DP-4 brown, moist, homogeneous, weak HCL reaction (Qes) 5 (9) 25 DP-5 6 Well graded SAND, subrounded to subangular, medium 8 dense, brown, moist, homogeneous, weak HCL reaction 10 (18)30 DP-6 Poorly graded SAND, subrounded to subangular, medium 10 dense, brown, moist, homogeneous, weak HCL reaction 13 (Qf) (23)10 35 23 DP-7 Well graded SAND subrounded to subangular, dense, 19 brown, moist, homogeneous, no HCL reaction (Qf) 16 GRAVEL lense (35)12 40 DP-8 6 Well graded SAND, subrounded to subangular, medium dense, brown, moist, homogeneous, no HCL reaction 9 (Qf) (17)13

HOLE No. FARW-2-00

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Sheet <u>3</u> of <u>3</u>

Job No. <u>XL1154</u>

PROJECT _ WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Meters (m) Sample No. Groundwater (Tube No.) Depth (ft) SPT Instrument Tests Penetration Lab Blows/6" Description of Material Blows/ft (N) 10 20 30 Well graded SAND, subrounded to subangular, dense, 10 DP-9 10 brown, moist, homogeneous (Qf) 15 (25)50 DP-10 6 Silty fine SAND, subrounded to subangular, medium 8 dense, brown, wet, homogeneous (Qf) 12 (20)12/6/2000 16 12/15/2000 55 DP-11 Sandy Elastic SILT, grading to sandy SILT, medium 8 9 dense, brown, wet, weak HCL reaction (Qf) 14 (23)18 60 no sample - casing plugged 19 65 20 21

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Department of Transportation

HOLE No. PROJECT Station	DP-12-00 WSDOT SR395 North Spokane Corrido Spokane, Washington 463+12.649		roject	-1651	Job No. XL1154 S.R. 395 .84 C.S.		_
Equipment	B-61	С	asing	8-in H			
Method of B	Boring 8-in Hollow Stem Auger	1-1-					
Start Date	October 5, 2000	Com	pletion	Date	October 5, 2000 Sheet 1 of 3		
Depth (ft) Meters (m)	Standard SPT Penetration Blows/6* Blows/ft (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	
27 2/5/01-6:03:39 P2		X	D-1		Poorly graded SAND, subrounded to subangular, medium dense, brown, dry, homogeneous, no HCL reaction (Qes) Silty SAND, dense, brown, moist, homogeneous, no HCL reaction, some tree roots (Qf)		
2011 INTRODUCTIVA 4004-10 WDO TPHIA, GPJ WSDOT, GDT 2/5/01-6:03:39 P2	8 7 12 (19)	X	D-3		Sandy SILT, medium dense, brown, moist, homogeneous, no HCL reaction, some tree roots (Qf)	-	
6					Figure A-21 Pa		

Washington State
Department of Transportation

HOLE No. DP-12-00

PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 3 Job No. XL1154

Depth (ft)	Meters (m)	Profile	10	Standard Penetration Blows/ft 20 30	40	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	Tests	Description of Material	Groundwater	Instrument
-	-7				1 1 1 1 1 1 1 1	14 17 17 (34)	X	D-4			Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction (Qf)	-	
25 —	-8				1 1 1	18 17 17 (34)	X	D-5			Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction (Qf)	-	
30-	-9				1 1 1 1 1 1 1	9 11 13 (24)	X	D-6			Silty fine SAND, medium dense, brown, moist, homogeneous, strong HCL reaction (Qf)		
35-	10 					11 16 17 (33)	X	D-7			Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction (Qf)	 	
40-	-12					15 16 18 (34)	X	D-8			Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction (Qf)	-	
45	13] 		1							-	

DP-12-00

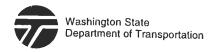


Figure A-21 Page (3 of 3)

Sheet <u>3</u> of <u>3</u>

Job No. <u>XL1154</u>

PROJECT WSDOT SR395 North Spokane Corridor Project

HOLE No.

INPROJECT/244/004,10/WDOTPH1A.GPJ WSDOT.GDT 2/5/01+6:03:41 P2

Sample Type Standard Sample No. Groundwater € Meters (m) (Tube No.) SPT Instrument Tests Depth (Penetration Lab Blows/6" Description of Material Blows/ft (N) 10 20 30 Silty SAND, dense, moist to wet, homogeneous, strong 11 D-9 HCL reaction (Qf) 15 17 GS (32)MC = 915 50 Silty SAND, medium dense, wet, homogeneous, strong HCL reaction (Qf) D-10 12 ₩. 01/19/2001 01/05/2001 16 12 (23)55 17 18 60 19 65-20 21

Washington State

HOLE N	اهUS	2EB-1-00					2	Department of Transp	orta	tion
PROJE	CT WSE	OOT SR395 North Spo	okane Corrido	or F	Project			Job No. XL1154		
	Spok	ane, Washington		_				S.R. 395		
Station	464	+45.111		(Offset	581.7	72	C.S		
Equipme	ent B-6	1		(Casing	8-in I	HSA	Ground El		
Method	of Boring	8-in Hollow Stem	Auger							
Start Da	ite Octo	ber 19, 2000		Con	npletior	Date	October 19, 2000	Sheet1 of2		
Depth (ft)	Meters (m)	Standard Penetration Blows/ft 10 20 30 4	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Desc	ription of Material	Groundwater	Instrument
SOIL INPROJECT244/004,10/WD07PH1A.GPJ WSDOT.GDT 2/5/01+6:24:34 P2			10 7 (13) 7 (14) 7 10 13 (23)	X	D-1		Well graded SAND with dense, brown, moist, hor (Qf) Fat Clay, stiff, brown, mo (Qf) Silty SAND, medium den HCL reaction (Qf)	gravel, subrounded, medium mogeneous, no HCL reaction pist, laminated, no HCL reaction use, brown, homogeneous, no brounded, medium dense, ous, no HCL reaction (Qf)		
-6								12/6/200 12/15/2000	- -	

HOLE No. **US2EB-1-00**

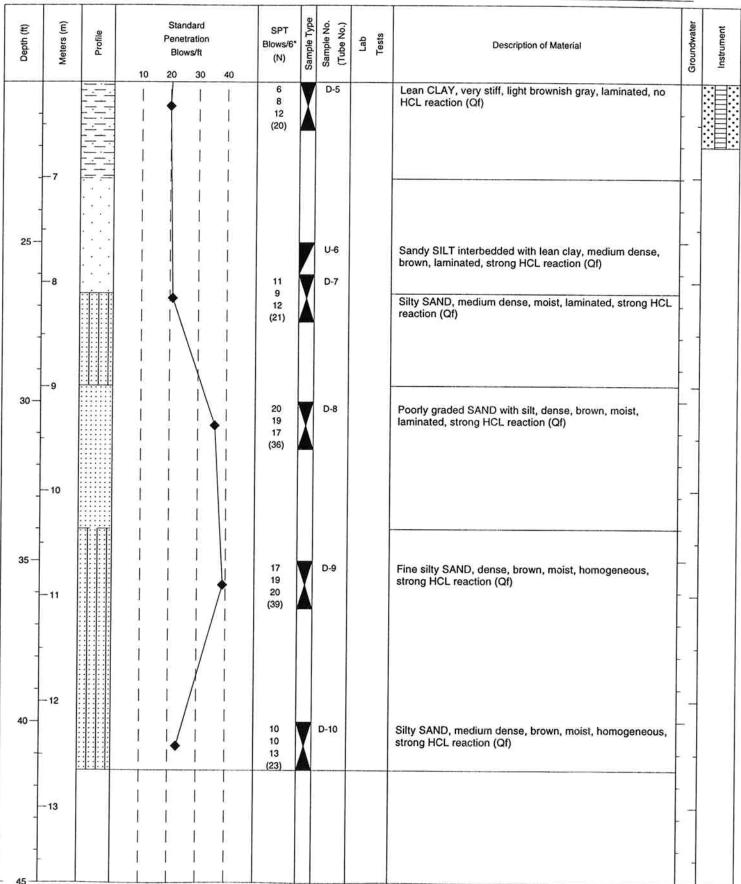
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SOIL

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PROJECT WSDOT SR395 North Spokane Corridor Project

Sheet 2 of 2 Job No. XL1154



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Department of Transportation

Method of Boring HWT casing advance, HQ core	Spokane, Washington S.R. 395
Equipment B-61 Casing HWT Ground El 1836.1 (559.64 m)	Equipment B-61 Casing HWT Casing advance, HQ core
Method of Boring HWT casing advance, HQ core	Method of Boring
Start Date October 19, 2000 Completion Date October 19, 2000 Sheet 1 of 2	Start Date October 19, 2000 Sheet 1 of 2
(i) Standard Penetration Blows/ft (N) SPT Blows/6* (N) Penetration Blows/ft (N) Penetration Blow	### Standard Penetration Blows/ft SPT Blows/ft N) ### Description of Material Description
	10 20 30 40
5— Well graded SAND, subrounded, loose, brown, moist, homogeneous, no HCL reaction (Qf) Well graded SAND, subrounded, loose, brown, moist, homogeneous, no HCL reaction (Qf)	Well graded SAND, subrounded, medium dense, brown, moist, homogeneous, strong HCL reaction (Qf)
	Well graded SAND, subrounded, medium dense, brown, moist, homogeneous, strong HCL reaction (Qf)

HOLE No. PH1-8-00

INPROJECT/244/004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01+6:05:08 P2

Washington State
Department of Transportation

Sheet 2 of 2 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Meters (m) Sample No. Depth (ft) (Tube No.) SPT Instrument Profile Tests Penetration Lab Blows/6* Description of Material Blows/ft (N) 20 10 30 40 U-4 Lean CLAY, stiff, brown, mottled, wet, laminated, no HCL \reaction (Qf) 12/6/2000 25 D-5 Silty SAND, medium dense, gray, wet, laminated, strong 7 HCL reaction (Qf) 6 (13)01/5/2001 30 12 D-6 Silty SAND interbedded with sandy silt, medium dense, 12 brown, wet, laminated, strong HCL reaction (Qf) 11 (23)10 35 D-7 Poorly graded SAND, subrounded, dense, brown, 13 15 bedded, strong HCL reaction (Qf) 18 (33)12 40 14 D-8 Poorly graded SAND, subrounded, dense, wet, bedded, 15 strong HCL reaction (Qf) 18 (33)13

HOLE No.	DP-13-00						Department of Transp	ortatio	on
PROJECT	WSDOT SR395 North Spo Spokane, Washington	okane Corrido	or PI	rojeci			Job No. XL1154	-	
Station	466+18.06				440	AF	S.R. <u>395</u>		
-				ffset	440.		C,S		-
Equipment	B-61		C	asing	HWT		Ground El <u>1840.6 (561.01 m)</u>		
Method of E	· · · · · · · · · · · · · · · · · · ·	nce, HQ core							
Start Date	December 1, 2000	°	Comp	pletion	Date	December 1, 2000	Sheet of3	1-1	
Depth (ft) Meters (m)	Standard Penetration Blows/ft 10 20 30 4	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	c	escription of Material	Groundwater	Instrument
10 — 3 10 — 3 15 — 5		5 8 6 (14)	X	D-1		Well graded SAND, s dense, brown, moist, (Qf)	n dense, brown, wet, homogeneous, subrounded to subangular, medium homogeneous, strong HCL reaction		

HOLE No. DP-13-00

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2\5\01+6:03:57 P2

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Figure A-24 Page (2 of 3)

Sheet 2 of 3 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

Standard Sample Type Sample No. Depth (ft) Meters (m) (Tube No.) SPT Instrument Profile Penetration Lab Blows/6" Description of Material Blows/ft (N) 10 20 30 40 U-4 Elastic SILT, very stiff, brown, moist (Qf) 13 D-5 17 Silty SAND, dense, brown, moist, homogeneous, no HCL 16 reaction (Qf) (33)25 U-6 8 D-7 8 Elastic SILT, brown, very stiff, moist, homogeneous, 19 moderate HCL reaction (Qf) (27)30 D-8 16 Elastic SILT, brown, very stiff, moist, homogeneous, 18 moderate HCL reaction (Qf) 11 (29)10 01/20/2001/ 12/15/2000 35 14 D-9 Silty SAND, dense, brown, wet, strong HCL reaction (Qf) 17 19 (36)12 40-D-10 11 Silty SAND, dense, brown, wet, strong HCL reaction (Qf) 12 15 (27)13

HOLE No. **DP-13-00**

INPROJECT/244/004,10\WDOTPH1A.GPJ WSDOT,GDT 2/5/01+6:03:58 P2

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Figure A-24 Page (3 of 3)

Sheet 3 of 3 Job No. XL1154

PROJECT __WSDOT SR395 North Spokane Corridor Project

Sample Type Depth (ft) Standard (Tube No.) Sample No. Groundwater Meters (m) SPT Profile Lab Tests Penetration Blows/6* Description of Material Blows/ft (N) 20 30 40 D-11 Silty SAND, medium dense, brown, wet, strong HCL 9 reaction (Qf) 8 (17)Sandy SILT, medium dense, blue/gray, moist, homogeneous, moderate HCL reaction (Qf) D-12 -15 Silty SAND, medium dense, blue/gray, wet, 50 homogeneous, strong HCL reaction (Qf) D-13 6 9 11 (20) 16 55 D-14 Elastic SILT, medium stiff, blue/gray, moist, 7 homogeneous, moderate HCL reaction (Qf) 7 (14)U-15 -18 60 Elastic SILT, medium stiff, blue/gray, moist, D-16 7 homogeneous, moderate HCL reaction (Qf) 9 19 65 20

Washington State

-2	Completion D Completion D	hod of Boring HWT casing advance	Spokane, Washington tion 466+68.423
medium dense, I reaction (Qf)	Standard Penetration Blows/ft (N) SPT Blows/6* (N) SPT Bl		
	Standard Penetration Blows/ft (N) SPT About Sample No. (Tube No.)		
medium dense, I reaction (Qf) To provide the provided state of th	tration Sample No. (Tube No.)		
7 (15) D-2 Well graded SAN homogeneous, n 9 (30) D-3 Well graded SAN moist, homogeneous poorly graded SAN poorly graded SAN moist, homogeneous poorly graded SAN poorly graded SAN moist, homogeneous poorly graded SAN moist, homogeneous poorly graded SAN poorly graded SAN moist, homogeneous poorly graded SAN poorly			
D-2 Well graded SAN homogeneous, not work to homogeneous homost, homogeneous Poorly graded SAN proofly grad		Casing	
D-2 Well graded SAN homogeneous, n		Casing	_
Well graded SAN homogeneous, n			Offset
Well graded SAN homogeneous, n	Tests Lests	8-in l	471.1
ND,	October 19, 2000	HSA	15
with trace fine gravel, subrounded, wn, moist, homogeneous, no HCL subrounded, dense, brown, moist, HCL reaction (Qf) subrounded, medium dense, brown, s, strong HCL reaction (Qf) subrounded, medium dense, geneous, strong HCL reaction (Qf)	Sheet 1 of 3 Description of Material	Ground El	S.R. <u>395</u> C.S
	Groundwater		

HOLE No. DP- 5-00

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Sheet <u>2</u> of <u>3</u> Job No. <u>XL1154</u>

PROJECT WSDOT SR395 North Spokane Corridor Project

Standard Meters (m) Sample No. (Tube No.) Depth (ft) SPT Groundwater Lab Tests Penetration Sample 1 Blows/6* Description of Material Blows/ft (N) U-4 Fat CLAY, stiff, light brown, moist, laminated, no HCL reaction (Qf) 25 Silty SAND, medium dense, brown, wet, homogeneous, D-5 7 strong HCL reaction (Qf) 9 (16)12/06/2000 & 12/15/2000 30 D-6 Silty SAND interbedded with elastic silt, medium dense, 10 dark gray, wet, stratified, strong HCL reaction (Qf) 14 GS (24)MC = 23 10 35 D-7 Lean CLAY, stiff, dark gray, wet, homogeneous, strong 4 HCL reaction (Qf) 6 (10)U-8 12 40-12 D-9 Poorly graded SAND, subrounded, medium dense, 14 brown, moist, homogeneous, strong HCL reaction (Qf) 14 (28)13

HOLE No. DP- 5-00

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Figure A-25 Page (3 of 3)

Sheet 3 of 3 Job No. XL1154

PROJECT __WSDOT SR395 North Spokane Corridor Project

Sample Type Standard Sample No. Meters (m) (Tube No.) £ SPT Instrument Lab Penetration Blows/6* Description of Material Blows/ft (N) 20 30 Silty SAND, medium dense, brown, wet, strong HCL 12 D-10 12 reaction (Qf) 12 (24)15 50 D-11 Silty SAND with interbedded clay, medium dense, brown, 9 mottled, stratified, strong HCL reaction (Qf) 10 GS MC = 3 (19)16 55 D-12 Elastic SILT interbedded with clay, medium dense, dark gray, wet, laminated, no HCL reaction (Qf) 6 5 7 GS (12)MC = 4660 D-13 Silty SAND, medium dense, gray, wet, homogeneous, strong HCL reaction (Qf) 9 -19 65 20 21

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PRO	DJECT	WSD	OT SR395 North S	pokane Corrido	or F	roject		Job NoXL1154		
		Spok	ane, Washington					S.R. 395		
Stat	tion _	468	+19.826		C	Offset	-122.			
Equ	ipment	B-6	1		c	Casing	8-in H			
Meti	hod of E	Boring	8-in Hollow Sten	n Auger						
	t Date		ber 6, 2000		Con	npletion	Date	October 6, 2000 Sheet 1 of 2		
Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft	SPT Blows/6* (N)	Sample Type	Sample No. (Tube No.)	Lab	Description of Material	Groundwater	Instrument
10-	-1 -2 -3		10 20 30	40	X	D-1		Well graded SAND, subrounded to subangular, medium dense, dry, homogeneous, strong HCL reaction (Qf) Well graded fine to medium SAND subrounded to subangular, medium dense, very dark grayish brown, moist, homogeneous, strong HCL reaction (Qf) Well graded fine to medium SAND, subrounded to subangular, very dark grayish brown, medium dense, moist, homogeneous, strong HCL reaction (Qf)		
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HOLE No. US2-1-00

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Washington State
Department of Transportation

Sheet 2 of 2 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

Standard Sample Type (Tube No.) Sample No. Depth (ft) Meters (m) SPT Instrument Profile Lab Tests Penetration Blows/6" Description of Material Blows/ft (N) 20 30 40 3 Lean CLAY, stiff, brown, moist, homogeneous, strong 5 HCL reaction (Qf) (12)25 D-5 Lean CLAY with silt and sand, stiff, brown, moist, disrupted, weak HCL reaction (Qf) 6 Silty fine SAND, subrounded to subangular, loose, brown, (10)wet (Qf) 30 Lean CLAY, stiff, light olive brown, moist, homogeneous, weak HCL reaction, bluish gray tint in some portions of D-6 4 8 sample (Qf) (12)35 14 D-7 Silty fine SAND, subrounded to subangular, dense, wet, 15 brown, homogeneous, strong HCL reaction (Qf) 20 (35)12 40 Silty fine micaceous SAND, subangular, dense, wet, D-8 11 brown, homogeneous, strong HCL reaction (Qf) 16 (27)13

Washington State
Department of Transportation

HOLE No. US	2-2-00			Department of Transpo	rialic	""
PROJECT WSI	OOT SR395 North Spokane Corrid	or Pro	oject	Job No. XL1154	_	
Spok	ane, Washington			S.R. 395	-	
Station 468	3+26.879	Offs	set 146.5	1 C.S.		
Equipment Mo	rooka MST-1100	Cas	sing HWT	Ground El1838.1 (560.25 m)		
Method of Boring	HQ casing advance					
Start Date Sept	tember 27, 2000	Comple	letion Date	September 27, 2000 Sheet 1 of 2		
Depth (ft) Meters (m) Profile	Standard SPT Penetration Blows/6 (N)	Sample Type Sample No.	(Tube No.) Lab Tests	Description of Material	Groundwater	Instrument
SOIL INPROJECT244/004.10AWDOTPH1A.GPJ WSDOT.GDT 2/5/01•6:05:30 P2			D-1	Well graded SAND, rounded to subrounded, medium dense, wet, homogeneous, weak HCL reaction (Qf) Well graded SAND, rounded to subrounded, medium dense, wet, homogeneous, weak HCL reaction (Qf) Well graded SAND interbedded with nodules of elastic silt, subrounded to rounded, medium dense, wet, homogeneous, weak HCL (Qf)		

HOLE No. US2-2-00

INPROJECT/244/004.10\text{WDOTPH1A.GPJ WSDOT.GDT 2/5/01+6:05:31 P2

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Department of Transportation

Figure A-27 Page (2 of 2)

Sheet 2 of 2 Job No. XL1154

PROJECT WSDOT SR395 North Spokane Corridor Project

Sample No. Sample Type Standard Meters (m) £ SPT (Tube No.) Lab Penetration Depth Blows/6* **Description of Material** Blows/ft (N) 20 10 30 40 2 D-4 Well graded SAND, loose, brown, wet (Qf) 2 Lean CLAY, soft, brown, wet (Qf) 4 Silty fine SAND, loose, brown, wet, homogeneous (Qf) (6) 12/6/2000 & 12/15/2000 25 5 D-5 5 Lean CLAY with silt, stiff, light brown, wet, strong HCL reaction (Qf) (12)8 Elastic SILT, medium stiff, grayish brown, wet, strong HCL reaction (Qf) 30 D-6 7 5 Poorly graded fine SAND with silt, medium dense, (12)grayish brown, wet, strong HCL reaction (Qf) 10 35 D-7 Lean CLAY with interbedded silty fine sand, stiff, brown, 4 7 moist, strong HCL reaction (Qf) (11) 12 40-8 D-8 Silty fine SAND, medium dense, brown, wet, 8 homogeneous, strong HCI reaction (Qf) 9 (17)13

Laboratory Testing

APPENDIX B LABORATORY TESTING

Natural moisture content and dry density determinations, sieve analyses, and Atterberg Limit determinations were conducted by Soil Technology of Bainbridge Island, Washington (under subcontract to Landau Associates) on representative samples recovered from the borings for the purpose of classification and evaluation of pertinent engineering properties of soil types encountered. Laboratory testing was performed in general accordance with the American Society of Testing and Materials (ASTM) standard test procedures, which are described below. The samples were checked against the field log descriptions, which were updated where appropriate in general accordance with ASTM D2487, Standard Test Method for Classification of Soils for Engineering Purposes.

Natural Moisture Content

Natural moisture content determinations were performed on soil samples recovered from the borings in general accordance with ASTM D2216. The results are presented in Table B-1 in this appendix and on the boring logs in the column labeled "Lab Tests."

Grain Size Analyses

Grain size analyses were performed on representative soil samples obtained from the borings in accordance with ASTM D422 to provide an indication of their grain size distribution. The results of the sieve analyses are presented on Figures B-1 through B-3 in this appendix. Samples on which sieve analyses were completed are designated with a "GS" in the column labeled "Lab Tests" on the summary logs.

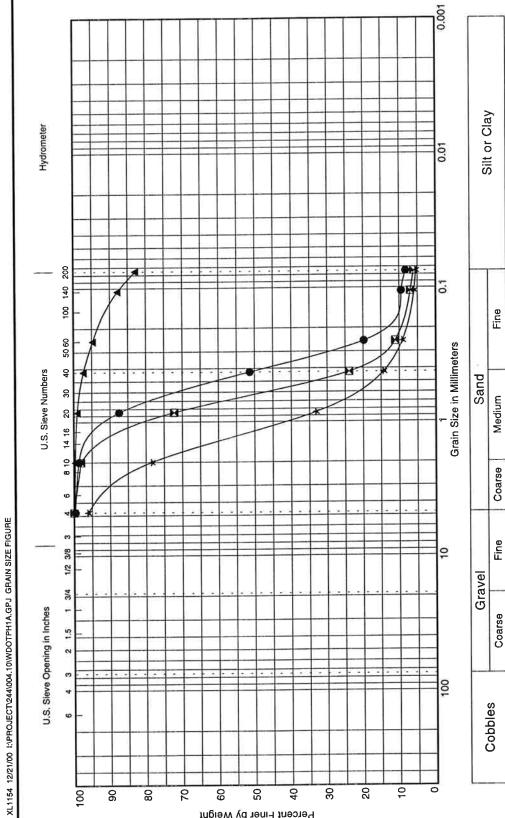
Atterberg Limit Determinations

Atterberg Limit determinations were performed on representative soil samples obtained from the borings in general accordance with ASTM D4318 to determine the liquid limit (LL), plastic limit (PL), and plasticity index (PI). The results of the Atterberg Limit determinations are presented on Figure B-4 in this appendix. Samples on which Atterberg Limit determinations were completed are designated by "AL" in the column labeled "Lab Tests" on the summary logs.

TABLE B-1 MOISTURE CONTENT DATA

	Exploration No.	Sample No.	Sample Depth (ft)	Moisture Content (%)
-	DP-1-00	D-5	25	4
	DP-2-00	D-5	25	2
	DP-3-00	D-3	15	30
	DP-3-00	D-10	50	1
	DP-4-00	D-7	35	33
	DP-4-00	D-8	40	42
	DP-4-00	D-9	45	50
	DP-4-00	D-10	50	2
	DP-5-00	D-6	30	23
	DP-5-00	D-11	55	3
	DP-5-00	D-12	60	46
	DP-12-00	D-9	45	9
	PH1-4-00	D-4	21	32
	PH1-5-00	D-6	30	26
	PH1-6-00	D-12	58	46

Grain Size Distribution



Percent Finer by Weight

Unified Soil Classification	SP-SM	SP-SM	ML	SP-SM
Soil Description	Poorly graded SAND with silt	Poorly graded SAND with silt	SILT with sand	Poorly graded SAND with silt
Natural Moisture (%)	4	2	30	-
Depth (ft)	25.0	25.0	15.0	50.0
Sample Number	0.5	0-5	D-3	D-10
Exploration Number	DP- 1-00	DP- 2-00	DP- 3-00	DP- 3-00
Symbol	•	H	4	*

WSDOT SR395 North Spokane Corridor Project Spokane, Washington

WSDOT SR395 North Spokane Corridor Project Spokane, Washington

Grain Size Distribution

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XL1154 12/21/00 INPROJECT/244/004.10/WDOTPH1A.GPJ GRAIN SIZE FIGURE

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
•	DP- 4-00	D-7	35.0	33	SILT with sand	MĽ
×	DP- 4-00	D-8	40.0	42	Lean CLAY	CL
•	DP- 4-00	6-Q	45.0	20	Lean CLAY	CF
*	DP- 4-00	D-10	50.0	2	Poorly graded SAND with SILT	SP-SM

Silt or Clay

Fine

Medium

Coarse

Fine

Coarse

Cobbles

Gravel

Sand

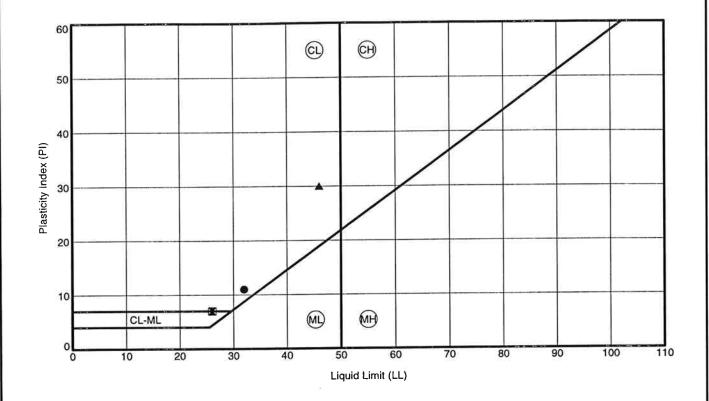
Percent Finer by Weight

Landau Associates

WSDOT SR395 North Spokane Corridor Project Spokane, Washington

Grain Size Distribution





ATTERBERG LIMIT TEST RESULTS

Symbol	Exploration Number	Sample Number			Plastic Limit (%)	Plasticity Index (%)	Natural Moisture (%)	Soil Description	Unified Soil Classification
•	PH1-4-00	D-4	21.0	32	21	11	27	Lean CLAY	CL
×	PH1-5-00	D-6	30.0	26	19	7	26	Lean CLAY	CL
A	PH1-6-00	D-12	58.0	46	16	30	39	Lean CLAY	CL

ASTM D 4318 Test Method



WSDOT SR395 North Spokane Corridor Project Spokane, Washington

Plasticity Chart

Figure B-4